WILD PLANTS AND SEEDS FOR BIRDS – AN ILLISTRATED DICTIONARY OF THE BEST FOOD FOR USE IN THE AVIARY

RICHARD MORSE

WILD PLANTS & SEEDS FOR BIRDS

An Illustrated Dictionary
of the
Best Foods for use in the Aviary

BY
R I C H A R D M O R S E, F.L.S.

THIRD EDITION

" CAGE BIRDS"
DORSET HOUSE, STAMFORD STREET, S.E.1

PREFACE

My first writings on the subject of wild plants for bird-foods were published—at the special request of bird-keepers-some many years ago, and late of experience has served only to confirm my belief that the most wholesome diet for birds in captivity is that which includes a high proportion of such seeds, fruits, and green foods as the birds themselves choose in their wild and natural state.

I do not, of course, suggest that the exact diet of a bird in the fields would be the best and most suitable for a bird in a cage, for the conditions of life in the two cases are vastly different. But there is every reason for believing that the addition of fresh, vital foods, absolutely untampered with, to the usual diet of captive birds, is one of the safest and surest of all means for balancing a diet and keeping those birds in thoroughly sound and vigorous health.

Every year now we arc leafing fresh facts concerning the wonderful effects of unspoiled natural foods upon the living body, whether of bird or of man. We know that the absence of certain elements, provided by the green plants, arc absolutely essential to a proper functioning of the organs, and that results of the direst character inevitably follow their deprivation. Some creatures are rendered wholly sterile, others contract the most painful and disfiguring maladies, while many perish miserably of lingering disease and all this is entirely the result of improper food; largely, perhaps, of preserved, over-cooked, or stale and contaminated articles. The obvious rented} is to rely more and more upon freshly gathered plants and their products of the right kind; and it is mainly to provide a simple and practical guide to food stuffs of this character that this little volume has been written. It is hoped, however, that it will serv e another purpose, too. There are many lovers of birds who have no desire whatever to confine them in cages, or even in aviaries, but are content to have them in the garden, and around the home, free to come and go as they wish indeed, preferring to come, because of the kindness and affection bestowed upon them, and of the safety which they gain by their association with ourselves. For bird lovers of this kind, the information contained in the following pages should be of value in showing the kind of plants which ma\ be used to attract the right sort of birds into their gardens, or to induce them to come again, and perhaps to stay as a result of a first chance-visit.

During most of my life a great deal of my time has been spent in watching the habits of our native birds in the fields and woods, and in studying the plants upon which they largely feed. The great majority of the plants described in the following pages have been collected under my own supervision, and used in both cages and aviaries under the most varied conditions in all parts of the country, and always with the greatest success. 1 have, of course, made no attempt to include all the plants which birds are known to eat, and many omissions will be apparent to the experienced naturalist. The species described, however, are mostly plants of wide distribution and abundant growth, and there are few areas of any size, even in the. most densely populated regions, which will not provide an ample supply of one or another at practically any time of the year.

Perhaps I should add also that the descriptions and terms in the following pages are not intended to be strictly scientific. This little book has not been written for botanists, and is, from a botanical point of view, open to severe criticism. I have, of set intention employed the simplest possible language, in order that the veriest novice in plant study may assimilate the information given. For this reason, I ask the indulgence of those of my readers who may have the good fortune to be well versed in the botanist's difficult art.

RICHARD MORSE .

WILD PLANTS AND SEEDS
FOR BIRDS
(In Alphabetical Order Throughout).

ASH, COMMON


Common Ash ***(Raxinus excelsior)***

The common Ash tree is very different from the Mountain Ash, and is in no way related to it. It resembles it only in the shape of its leaves, though even these are quite different when closely compared. This tree, which is really the true Ash, never produces berries. Its fruits arc dry, flat, winged structures, and hang from the twigs in great bunches called " keys," or sometimes "locks-and keys."
Each “key" is long-oval in shape, and is about an inch and a half in length. The "wing" is often twisted when the seed is ripe, and the latter, about half an inch long. may be seen distinctly at the end near the stalk. Not many birds are fond of Ash seeds, but the Haw- finch will eat them readily enough, and as they may be gathered easily in immense quantities during the autumn, it is a good plan to lay by a supply for the winter. If properly dried in the sun before storing, they remain in excellent condition for many
months.
The Ash is a common tree in foods and hedges in most parts of Britain, and may be anything from about thirty to eighty feet in height. The spring buds arc large, black, and very conspicuous, and expand into flowers and leaves.
The leaves are compound, that is, they consist of a number of small leaflets; the latter being arranged in from four to seven pairs. with one single leaflet at the end
The flowers appear in April and May, and are small and greenish, with purplish-black stamens. Some contain stamens only, some pistils only , and some both stamens and pistils. In many cases there is not a single pistil- flower on the whole tree, and this means, of course, that such trees bear no fruits. But the tree grows so freely along the countryside, that "locks-and-keys" may usually be had in abundance by those who wish for them.

ASH, MOUNTAIN (See MOUNTAIN ASH).

BEECH

Beech (Fagus sylvatica)

Beech Nuts have never been very widely used as a food for birds, or indeed in any way at all, though they are really a very' nutritious food, and contain quite a lot of assailable oily matter. Hence, they are of great value in maintaining a proper bodily heat during the cold months of the year.

It should be remembered, too, that the beech is a very large and free-flowering tree, and in some seasons produces a truly amazing harvest of nuts, which can be gathered in bulk with the least possible trouble.Quite a number of our native birds are fond of Beech mast (as the fruit of this tree is often called), and even Softbills will eat it very readily if properly crushed and prepared for them—really a very simple process.

As I have already pointed out in CAGE BIRDS ANNUAL (1925), Beech nuts seem to be one of Nature's provisions for birds against the coming of winter's cold. The proteins contained in them reach the high figure of ninety-five grains to the ounce, to say nothing of the valuable oil.

To see this figure in its proper proportion, it is well to recall that the proteins (the truly nutritive elements) of hens' eggs amount to only fifty-eight grains per ounce, those of bread forty-five grains, of canary -seed only thirteen grains, and even the best English beef has no more than seventy-five grains. The Beech nut, therefore, is a really valuable and highly nutritious food, and may be kept in excellent condition all the winter through.

Beech trees are well known to most people, especially in chalk and limestone districts. They are abundant in many of our southern counties, and some over a hundred feet in height, and two or three times that distance across their outspread branches.

The flower-catkins appear in April and May, just as the leaves are reaching their full development, and the prickly fruiting capsules (see illustration) burst and shed their triangular nuts in the early autumn months.

In some seasons a large number of, flowers would seem to be infertile, for the shells, when squeezed in the fingers, are found to be empty. A tree with an abundance of these empty shells beneath it is often encountered , and it is usually best to leave it and seek more profitable fields.

BLACKBERRY

Blackberry *(Rubus fruticosus)*

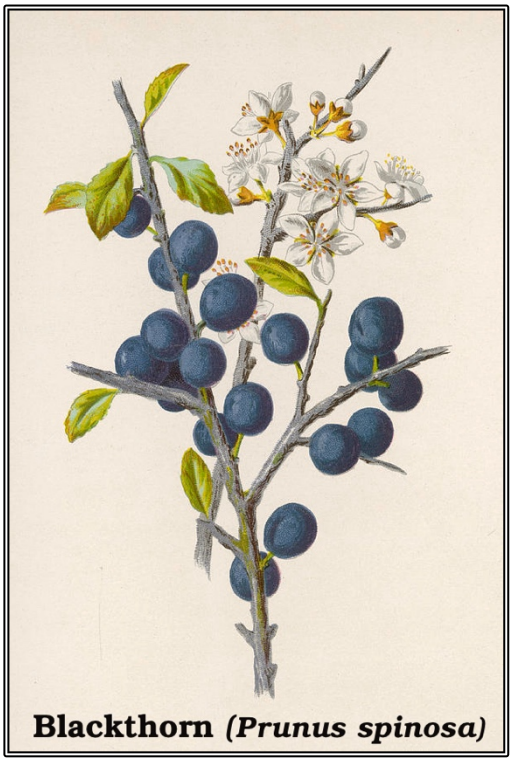
The Blackberry is one of the most useful fruits of our early autumn hedgerows, and directly the berries show signs of ripening, which they usually do in August, our native birds been their annual feast.

Not only Bullfinches and Hawfinches, but Blackbirds and a number of other songsters devour these juicy fruits with evident relish. In captivity almost all our birds take them readily, and even Canaries and foreign fruit-eaters benefit considerably by their use.
The Blackberry, too, is greatly enjoyed by most Softbills, and fruit is such an important item in the diet of these birds that no effort should be spared to include some proportion of it in season.
Blackberries contain a medicinal principle with a rather marked astringent action, and on this account, probably have an excellent tonic effect upon the stomachs of birds They are also, of course, of great value when ripe as a colour- food, and have none of the unpleasant after-effects sometimes associated with artificial products used for this purpose.
The Blackberry, or Bramble, is an abundant plant in most of our woods and hedgerows, and its long prickly stems arc known to every' country dweller. The leaves consists of about five stalked leaflets, which have sharp points and notched edges. They turn bronzy or purple in the late autumn, and often persist upon the plant throughout most of the winter.
The flowers appear from June to September, and each has five white or pinkish petals. In general appearance they resemble small single roses, with a mass of stamens in the center, but usually grow in fairly large erect clusters. The well-known fruits are first green, then red, and finally red-purple or black, and all these stages may frequently be found upon the same spray.

BLACKTHORN

The Blackthorn is really a wild plum, and its fruits, known as Sloes, are a familiar sight along our autumn and winter hedgerows. It seldom, however, reaches the size of a proper tree, and is usually in the form of a spiny, much branched shrub, about six or eight feet in height.

Blackthorn produces its flowers very early in the year, often before the snows have melted, and is not often noticed again until its small round fruits, with their pretty bluish bloom, become conspicuous along the twigs.
Sloes are amongst the sourest of all our native fruits, but if left upon the trees until late in the year they become pleasantly edible, and are then relish by a number of birds. In captivity, however, few species seem to care for them so much as the Hawfinch, who usually greatly enjoys an occasional feed.



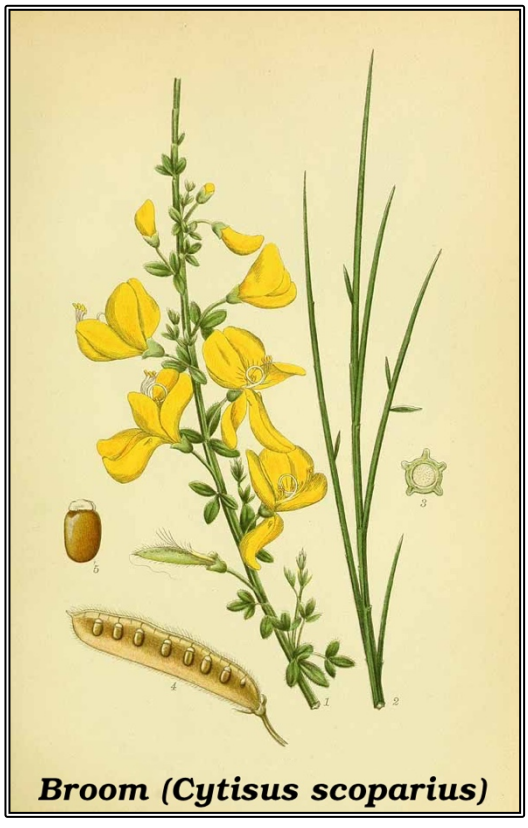
Blackthorn *(Prunus spinosa)*

BLUEBOTTLE (See CORNFLOWER).

BRAMBLE (See BLACKBERRY).

BROOM

Broom is a plant which is not often used in the aviary, for few of our pet birds seem to care about its seeds . The Hawfinch, however, thoroughly enjoys an occasional feed of them, and as they are easily gathered, and exceeding nutritious, they might with advantage be used to a greater extent than they are .
The Broom, too, has another value for bird-keepers, for its tender young tops in the early spring form an excellent green-food, and do much to restore the loss of tone from which the system often suffers after the dietetic errors of the cold months. Bullfinches in particular are very fond of Broom-buds and tender shoots, and may be given them in moderation without any fear of harm, though excess should be avoided.



Broom (Cytisus scoparius)

This plant is fairly common, often even abundant, in most parts of Britain, and covers vast stretches of heath-land in May and June with its gorgeous display of bright yellow flowers. It is usually) in the form of a shrub from three to six feet in height, and has long, green, straight branches with numerous angles and furrows upon them.
The leaves have short stalks, and may consist of from one to three small leaflets, seldom more than half an inch in length.
The flowers are fully an inch long, and in general shape resemble those of the common peas of our gardens, to which, indeed, the Broom is closely related. They are followed by narrowish pods about two inches in length, which ultimately become black, and liberate the seeds by splitting and curling.
The twigs of Broom have a diuretic action, and have been used in medicine in the treatment of diseases of the kidneys.

BUCKWHEAT

Buckwheat (fagopyrum esculentum)

Although the Buckwheat, or Branks, is not really a native plant, it may often be found apparently wild in of this country, for it is cultivated to quite a considerable extent as a food for pheasants and other birds; it gets scattered far and wide, and so the plants establish themselves along many of our fields and waysides.
The great value of Buckwheat lies in its very high nutritive properties. It is said to contain nearly the same amounts of proteins as good barley meal, viz., about thirty to forty grains to the ounce, and its starchy and sugary constituents amount to will over fifty per cent
E P S Elfick specially recommended aviarists and breeders of Canaries to use during winter equal parts of the very best Oats, fresh malted Barley, and Buckwheat. These three ingredients are to be well mixed together, ground coarsely in a mill, and a handful thrown occasionally into the flights and aviaries. Buckwheat flour has often been used both here and abroad, and especially in America, in the making of cakes for human consumption, though in this country now the plant is grown for practically no other purpose than the feeding of game-birds, or for ploughing into the ground as green manure.
The Buckwheat plant is an annual species, with erect, a branched stems, reaching a height of about eighteen inches. The leaves are between heart-shaped and arrow-shaped, and have rather sharp points.

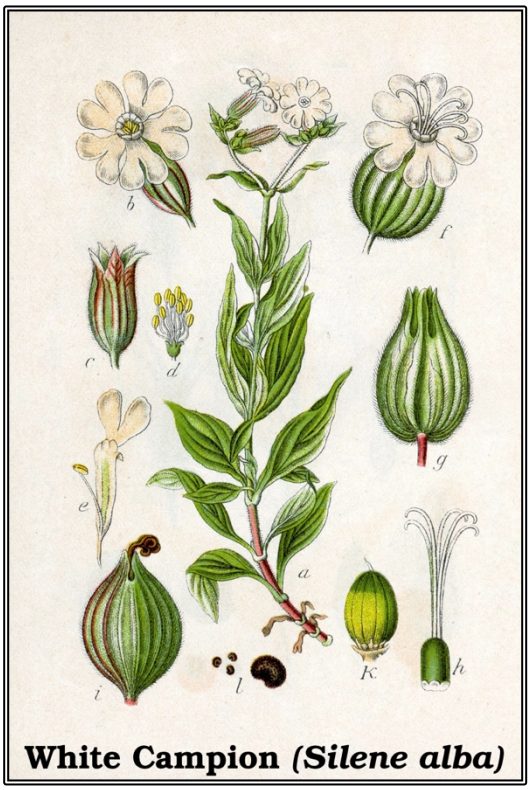
The flowers, from July to September, grow in many- flowered clusters, and though prettily variegated with green, red and are never very large or conspicuous. They remind one in their general form of the blossoms of the Knotgrass, to which the Buckwheat is closely related.
The peculiar name of this plant is said to be a corruption of Beech-wheat, and certainly its three angled seeds or nutlets closely resemble in shape the well-known mast or nuts of the Beech tree

BURDOCK. GREAT


Greater Burdock *(Arctium lappa)*

The Burdock, Great Burdock , or Clot-bur bears an abundance of very large wrinkled seeds, which have such a bitter taste that very few birds seem to care about them. In a wild state one may sometimes see Hawfinches and Greenfinches feeding upon this seed, and it is probably a very fine tonic in small quantities, but it never appears to be much appreciated in the aviary, and should be used only in strict moderation in a wild-seed mixture.
Burdock is a large, coarse plant, with branched and furrowed stems reaching a height of about three feet. The leaves grow alternately along the stems, and the lower ones are broad, egg-shaped to heart-shaped. structures, measuring a foot or more in length. Generali) the undersides are somewhat hoary or cottony, but the upper surface is free from hairs.
The flower-heads bear a general resemblance to those of the Thistles, and are not in any way like those of the true Docks. They measure about one inch in diameter, and consist of a number of reddish-purple florets, stamens and white styles.
Beneath the florets are the overlapping hooked bracts, which form the globular "burrs" after which the plant . These are usually more or less covered with a cobwebby substance, and readily become attached to one's the seeds are ripe and ready for use .
Burdock, in spite of the bitterness of its seeds, is a thoroughly wholesome plant, and has often been used as purifying medicine. The young shoots in times gone by were often boiled as a spring vegetable, and even eaten as an ingredient of salads.

CAMPIONS



White Campion *(Silene alba)*

Campions are great favorites with many of our native Finches, and their seeds are greedily eaten, not only Bullies, but by Greenfinches, Linnets and Siskins. Canaries, too, much enjoy them.
All our British Campion plants are very near relatives of the chickweeds, and though they are of no use as green foods, their seed-capsules are unusually large and abundant.
No analysis of the seeds seems to have been made, but there is no doubt whatever about their wholesomeness, and their properties are probably almost exactly the same as those of Chickweed, No British Campion has ever been known to be in any way injurious to any kind of livestock.
Perhaps the best known and most useful of the Campion plants is the white, or evening. Campion, so its blossoms open and become fragrant towards dusk. This is the species shown in the drawing below.
The stems of the white Campion reach a height of about two feet, and are more or less branched from below upwards. They are always somewhat swollen into small knots at the joints.
The leaves on the lower parts of the plant maybe as much as five or six inches in length, but the upper leaves are usually about three inches.
They always bow in opposite pairs, and are rather narrow and pointed. Also, they are usually distinctly hairy.
The flowers are large and handsome, and each consists of five pure white petals, notched in the center.
During the sunny part of the day, they often remain closed, but are very conspicuous in the evening, and even on the darkest of nights may be seen by their wonderful whiteness, which almost amounts to luminosity.
The red Campion differs from the white in little else save its flowers, which are a pleasing shade of red.
In the case of these two Campions, it must be remembered that there are both male and female plants.
There is little difference in the general appearance of the sexes, but it is, of course, only the female plants which produce seed. The male flowers merely drop away without leaving any capsules. The flowers usually begin to be abundant in May, and the seed-pods soon follow.
The red Campion grows mainly in hedge-banks and dampish woodlands, hut the white species is frequent also in ploughed fields, where it often completely overtops the clover or other crop amongst which it grows.

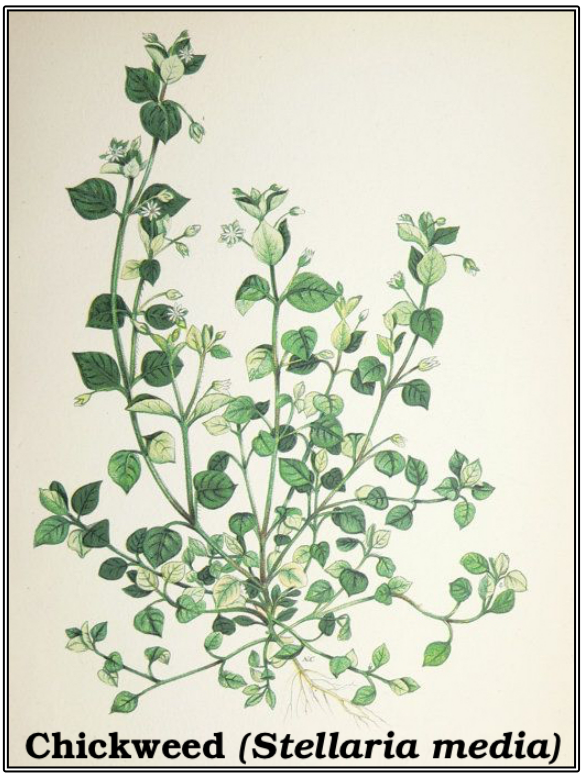
CANARY SEED, See GRASS CANARY

CHARLOCK See also MUSTARD.

Charlock *(Sinapis arvensis)*

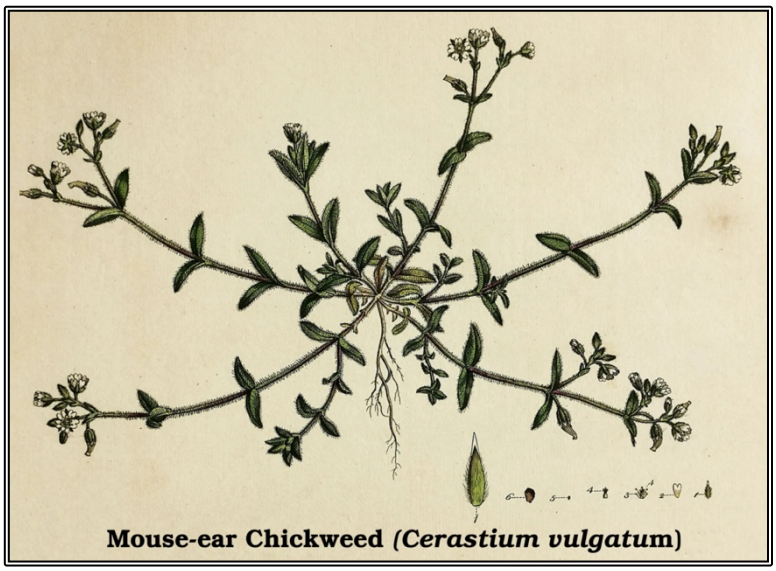
Charlock is one of the most abundant of British weeds, and can usually be had in plenty in every part of the country. It grows mainly in cornfields and ploughed land, sometimes so profusely as to make one suppose it must have been planted.
Although such a troublesome pest of the farmer, Charlock is really very closely allied to the cultivated Mustard, and it is a fact that even the farmers themselves are often unable to tell one plant from the other.
From the bird-keeper's point of view, too. Charlock and Mustard seeds are very similar in their properties but the former are smaller in size and much darker in colour.
Charlock seed is one of the greatest favorites with the wild birds of the fields, and is taken with very delight by Greenfinches, Linnets. Twites, Redpolls, and many more
Linnets, in particular, show a marked preference for that post-mortem examinations of these birds have seeds of the Charlock tribe, and it is a significant fact shown that their stomach contents contain more of the seeds of Charlock than of any other weed.
The principal use of Charlock seed is as a heat-giver, and it has a particularly good effect, therefore, upon birds kept in a cold room during the winter months. I have known of many cases where its use has completely banished tendencies to asthma and kindred disorders brought on by chills.
The Charlock plant has branched stems which reach height of from one to two feet and are clothed with roughish, almost bristly, leaves. The latter are usually lobed or The flowers are bright yellow and measure about half an inch across when fully expanded. Each one has four petals arranged in the form of a cross.
The seed pods are about two inches long and each one is squarish or angular, with an awl-shaped beak at the top.
It is worth noting that Charlock is replaced in many districts by the white Mustard, a plant which is often grown by the farmer for sheep, etc., and which grows so readily that it spreads to other fields and becomes a "weed."
White Mustard and Charlock are almost exactly alike except in their seed pods. The beak of the Mustard-pod, instead of being awl-shaped, is flat
like a two- edged sword.

CHICKWEED


Chickweed *(Stellaria media)*

Chickweed is a name that is given to many plants, some of which are not really chickweeds at all, but totally different weeds. The true Chickweed (Stellaria media) is one of the very best of all our wild green- foods. It has stood the test of generations, and has never had a serious criticism.
You may use it at any stage of its life with certainty of good results, and in its maturity, it is a favorite food with most hens for their nestling birds.
Almost all our British birds delight in it, Goldfinch. Greenfinch. Chaffinch, Bullfinch and Linnet eat it greedily in their wild state, and so do Blackbirds. Skylarks and Yellow Buntings , even with foreign birds and Canaries it is equal!) welcome
The green leaves and shoots of Chickweed are rich in just those vita! chemical elements which are essential to good health and fitness, and have for long been known to have a most pronounced good effect upon the blood stream of the birds to which they are regularly given.
The stems may be anything from 6 in. to 18 in. length, and are usually more or less prostrate, for at any rate a great part of their length, upon the ground where they grow They are somewhat swollen at the joints, are very brittle, and have a peculiar single line of fine hairs running along their entire length, but alternating from side to side at every pair of leaves.
The leaves themselves are roughly egg-shaped, but end in fairly sharp points, and always grow in opposite pairs alone the stems.
The lower leaves, however, are often almost heart shaped, and have quite decided stalks, while the upper ones usually have no stalks at all, but are seated directly upon the branches from which they spring.
Chickweed flowers each have five very small white petals, but each of these is so deeply divided down its center that you may easily be deceived into thinking there are really ten.
If you take a single blossom to pieces, however, you can decide the question in a moment.
It should be noted, too, that in the flowers of this weed the white petals are actually shorter than the green sepals which are placed beneath them.
The little shiny seed-pods usually occur at the end of drooping wiry stalks.
Chickweed grows plentifully in fields and gardens everywhere, and may be found in a fit state for gathering in any month of the twelve

CHICKWEED, Mouse-ear


Mouse-ear Chickweed (*Cerastium vulgatum*)

Mouse-ear Chickweed. whose botanical name is Cerastium vulgatum, should not be confused with the true, or common, Chickweed, which is known to botanists as Stellaria media, because they are really quite different plants, and are put to different uses in the aviary.
Mouse-ear Chickweed is a very valuable weed, but it is useless to gather it until it reaches its seeding stage it is of no value whatever as a green food .
Its seeds, however, which are produced in great abundance, make an irresistible appeal to practically all British birds, as well as to Canaries, and seem to be equally enjoyed, whether given in their ripe or half-ripe condition When fully ripe, the seeds closely resemble those of Shepherd's Purse, and are a great deal smaller than those of the true Chickweed.
It is a weed that can always be used with perfect safety, and with excellent results.
Mouse-ear Chickweed is a very variable plant, and as many as thirty fairly distinct varieties have been described. The stems may be anything from 1 in. to 1 ft. or more in height, and are usually a good deal branched.
Also, it is important to notice that the stems as a whole are covered with fine hairs, which are sometimes so sticky that they catch tiny flies upon them, to say nothing of a good deal of dust.
The stems of the true Chickweed arc never hairy all over, but have the hairs in a single line along the stem.
The leaves of the Mouse-ear Chickweed are smaller than those of the true Chickweed. They grow in opposite pairs, and their shape and hairiness give them a fairly close resemblance to the ears of the animal referred to in the name. Those which grow at the base of the plant have stalks, but all the upper leaves are seated directly upon the stems.
The flowers are made up of five white petals, each of which is notched at the tip, though not nearly so deep as in the case of the true Chickweed.
They are very small and inconspicuous, and some- times hardly open at all, but the seed capsules which follow are well known to all country people.
They open at the top when ripe, and disclose a ring of minute teeth. When this stage is reached the plants must be held vertically as they are picked, or all the seeds will be lost.
Mouse-ear Chickweed is abundant in all fields and gardens, and flowers throughout most of the year.

CLEAVERS (See GOOSEGRASS).

COLTSFOOT

Coltsfoot *(Tussilago farfara)*

Coltsfoot is one of the earliest of all our spring flowers, and its blossoms arc often to be seen here and there before the end of January. March, however, is the great month for Coltsfoot, and a little later the seeding-heads are evident everywhere.

The great popularity of Coltsfoot amongst bird- keepers is due to the fact that it is a food and medicine combined, and is one of the finest of all natural remedies for any trace of wheeziness or asthma, is often most The improvement which follows its use marked, and I have known several cases where it has put an end to these disorders after all the chemist's preparations have been tried in vain.

Also, it is regarded by practically all British birds as a very pleasant medicine, and they take it with plainly obvious relish.

I have never heard of the slightest harm resulting from its use, even when given in abundance, and have come to the conclusion that it is one of the most wholesome of all our wild seeds. The Chaffinch in its wild state is a real glutton for Coltsfoot.

It should be remembered that you never get any of this seed in the mixtures obtained from threshing machines. The feathery heads are scattered far and wide long months before the harvest, and I know of no later weed that has the same good virtues.

Hence every effort should be made to lay in a supply of Coltsfoot in the Spring. Nature offers it abundantly on every hand.

The accompanying sketch shows the general form of the plant. The lower-heads rise in great numbers straight up from the bare earth, and although they are clothed with small scales, it is usually several weeks later that the true "coltsfoot " shaped leaves appear.

The flower-heads resemble nothing so much as pale, small Dandelions, with very finely cut florets, but may be identified in a moment by their scaly stalks.

When the flowers have withered, the heads droop gracefully downwards, and remain in that position until the seeds are ripe.

They then become erect again, and often elongate to a foot or more, finally opening a globular ball of silvery pappus, which is eagerly sought by many birds as a lining material for their nests.

Coltsfoot grows abundantly on moist and heavy soils all over the country. It seems, however, to have a special preference for chalk, and often turns many a railway bank into a beautiful spring carpet of palest gold.

CORNFLOWER


Cornflower *(Centaurea cyanus)*

Cornflower is a plant that is closely related to the Knapweeds, or Hardheads and is very much the same in its appearance and its usefulness. Both British birds and Canaries always enjoy a feed of these seeds, and they form one of the most valuable ingredients of some of the best wild seed mixtures, especially where Goldfinches are concerned

Although the Cornflower is a truly wild plant, and may be found growing as a cornfield weed, practically all over the southern half of Britain, it is so attractive in its appearance that it has won its way into many people's gardens as a regular inhabitant of the border and the flower-bed. This suggests at once that the plant has a double use. It has all the advantages of an ornamental hardy annual, and is in addition one of the most useful bird-seeds that could be grown .

Those who wish to cultivate the Cornflower for this purpose should remember that its seeds maybe sown at least twice each year, thus ensuring a long succession of flowers and seeds. The stronger plants are usually those from autumn grown seeds. The best time for sowing is about August or September, and the only attention necessary will be a little occasional thinning of the seedlings.

Another crop may be sown in April, and will give a good harvest when the first is over.

For those who wish to identify the true Cornflower when growing the weed in the fields, the following brief description may be found useful.

The stems arc erect, branched, and somewhat slender, and reach a height of about eighteen inches or more, largely according to the richness of the soil in which the plant grows. They also have narrow grooves running along their entire length.

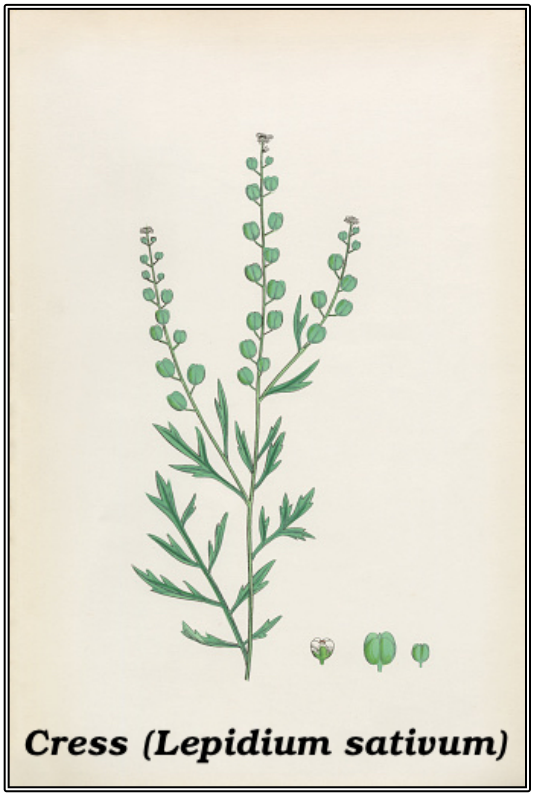
The leaves are rather long and narrow, bearing a general resemblance to those of the Black Knapweed. The lower ones may have stalks, and are often notched along their edges, but the upper ones are usually narrow, unnotched and stalkless, as shown in the illustration.

The flower heads measure about an inch in diameter. The outer florets are large and bright blue, those in the center are purplish and much smaller. Each seed is gray and silky, and has a tuft of fine hairs at its summit.

CORN SPURREY (See SPURREY, Corn).

CRESS

The common Cress of our gardens is sometimes found as an escape from cultivation, and has been grown by a few bird-keepers especially for use in the aviary . It is rather hot and biting to the taste, and when quite fresh has a beneficial tonic action . It is said to be particular!) good in all kinds of lung affections.
Cress seed readily develops a moldiness in scent and taste if allowed to become stale and damp, and in that state it should, of. course, never be used as a food.
For Watercress. Wintercress. etc., see separate headings.



Cress (Lepidium sativum)

DANDELION

Dandelion stands alone amongst our native weeds. There are mans which close!) resemble it, but none which is quite the same. It is a plant which you may find in bloom in any month of the twelve, and for that reason some folk argue that it has no special season of flowering.
This, however, is a great mistake. The Dandelion's true harvest is in the Spring, and every close watcher of Nature knows that there is never a second display anything like the first.
It turns the places where it grows into a perfect sea of gold, so that you can see whole meadows gleaming with it across great distances of open country.
If you let this early harvest slip away, you will have to wait at least twelve months for another.

Dandelion *(Taraxacum officinale)*

It is partly, if not mainly, for this reason that the seed mixtures one gets from the farmer usually contain such a small proportion of Dandelion.
And this, of course, is much to be regretted, for there is hardly a finer tonic amongst all our weeds than is provided by this plant. There is a high percentage of easily assimilable mineral salts in Dandelion, and it is generally conceded to be the best blood purifier in nature's medicine cabinet.
The great point in gathering Dandelions is to be sure that you get the right plants. Not many folks, except botanists, realize that there are over 300 Dandelion like plants growing wild in this country and that the true Dandelion is the only one of them all which has the good virtues referred to above.
Hawkweeds and Hawkbits and closely resemble the Dandelion, and their seeds are freely devoured by the birds, but the medicinal properties are lacking in all of them.
The true Dandelion has its similar flowering heads growing singly at the tops of bare and unbranched stalks. Each stalk is smooth and shiny, always hollow. and exudes a bitterish milky juice as soon as broken .
It is important to remember that those Dandelion-like weeds which bear two or more flower-heads on a single or branched stalk are never proper Dandelions, however, closely they may resemble them in other ways.
The leaves of the Dandelion always have the familiar backward-pointing lobes shown in the sketch, and if a box or flower-pot is turned over these in their young stages of growth, then become beautifully tender and mild, and make a tonic green food that is digested even by delicate birds with the greatest ease.
A separate fruit or seed is also shown in the sketch. It has a circle of silky hairs at the top. a long slender stalk, and a notched seed at the bottom.

DEWBERRY

The Dewberry' is a near relative of the Blackberry, or Bramble (see under Blackberry), but is usually of somewhat weaker and lower growth. It occurs commonly in woods, thickets and hedgerows throughout the country, and produces its white or pinkish blossoms in June and July.
Dew'berries have the same medicinal virtues as Blackberries, but are usually rather more luscious in character, much juicier, and are covered with a bluish "bloom," which rubs off at the lightest touch. On account of this blue appearance of its large and handsome fruits, the Dewberry is sometimes known as the Blue Bramble.
It is a favorite late summer food of many of our native birds, and is of great value in bringing out the fine colors of their plumage.


Drewberry *(Rubus caesius)*

DOCK, Broad-leaved

The Broad-leaved Dock has much the same general appearance as the Curled Dock (see opposite), but is a rather larger and stouter plant. Its branched stems reach a height of three feet or more, and the largest leaves are often a foot in length "The lower ones are broad, and somewhat heart shaped at their bases, but the stem-leaves are much narrower, and have usually wavy edges. This Dock is an abundant weed in cultivated ground all over the country, and flowers from July to September. It has the same properties and uses as the Curled Dock described opposite.

Board Leaf Dock *(Rumex obtusifoliu)*

DOCK Curled

Curled Dock is one of the very worst weeds which the British farmer has, and has become so abundant in many that the Ministry of Agriculture can now order compulsory destruction, and impose heavy penalties if such orders are not obeyed.
It is the farmers pest but, is the great friend of the birds, and they come from far and wide to enjoy the feast of Dock seed—the Bullfinches in particular, and young birds as well as old. Dockseed, in fact, is one of the real favorites amongst the wild foods of our native birds, and even Canaries will take it readily enough, and benefit considerably as a result.
Many successful breeders of Bullfinches have claimed that no other seed has such a marked good effect upon the plumage of these birds, which is exactly what one would expect from their great fondness for it in their native state. Then further, Dockseed contains quite a goodly percentage of oily matter of a most wholesome kind, and this makes it of great value as a winter

Curly Dock *(Rumex crispus)*

food, for keeping up the bodily temperature and dispelling possible chills.
This oil, too, serves as a fine internal lubricant, and 1 do not think it has ever been accused of causing undue fatness. In fact, the effect seems to be the reverse. The bowels are kept in such a healthy condition that there is no morbid accumulation of fat, and for this reason, probably, Dockseed has often been used as a very effectual corrective where a tendency to over-fatness has been observed.
Still another advantage of Dockseed is the ease with which it can be gathered in quantity, and the fine storing properties it possesses. The plants are tall and robust, and the immense seed-heads can be dried off just as they are, and will remain in perfect condition right through the winter.
The branched stems of the Curled Dock reach a height of about three feet, and at the base of each one is a stout, brown rootstock, somewhat tapering in shape, and going deep down into the earth.
The leaves grow alternately along the stems, and may be from six to ten inches in length. Their shape is roughly like a lance-head, narrowing towards the rather pointed tips. It is from the wavs and crisped edges of the leaf-blades that the name of "Curled" Dock has been derived.
The flowers are small, greenish, and inconspicuous, and grow not only in tall, spike-like clusters at the summits of the branches, but also, as will be seen from the illustration, in little tufts partly down the stems. The seeds are brown when ripe, and of a distinctly triangular shape .

DOCKEN (see DOCK).

ELDER


Elder *(Sambucus nigra)*

Elder is a common tree practical!) all over Britain, and its berries are some of the finest of all Nature's colour - foods. Moreover, they are the special favorites of a very large number of birds, and you may see not only Starlings and Thrushes and other similar birds greatly enjoying these juicy fruits, but also many of the Finches, and even some of the Warblers.
In the aviary. Elderberries are always welcome. Waxwings. nightingales and Blackcaps. Which perhaps get little opportunity of taking these berries directly from the hedgerows, always relish them in captivity, and improve much in plumage in consequence.
There would seem to be some kind of natural preservative in Elderberries,

for they keep in excellent condition for a surprisingly long time. If you find a tree which has not been cleared by the birds (rather a rare thing), you will observe that, even quite late in the autumn or winter, the berries still hang. They may be a trifle dry and shriveled, but a little hot water containing a pinch or two of sugar will soon transform them into a delectable meal.
The best plan, of course, is to gather your supply of Elderberries before the wild birds have taken them, and to hang them up in bunches to dry in an airy out house. By using sweetened hot water, you can thus provide this valuable food and medicine right through the winter .
The Elder is usually quite a small tree with a trunk, about the size of one's thigh, and the younger branches are filled with a soft, white pith.
The leaves are made up of from two to four pairs of leaflets, with one terminal one. as will be seen from the illustration Their edges are finely notched in saw -like fashion
The flowers grow in large, flat -topped, creams clusters, and though the individual blossoms are no more than one- fourth of an inch in diameter, the clusters make a conspicuous show in June, and have a powerful, distinctive fragrance.
The berries are small, globular, and glossy, and turn to a jet black when ripe.
NOTE. The Dwarf Elder is not a tree, and its stems die down each year. The berries of this plant are similar in appearance to those of the Elder tree, but should not be used as a bird-food.
Dwarf Elder is a rare plant, except in a few districts.

FIGWORT


Figwort *(Scrophularia nodosa)*

Figwort is a plant which has never been very' widely used by bird-keepers, though many of our native songsters arc remarkably fond of its seeds, and they are said to have an especially good effect during. and immediately after, the molt.
In its wild state the Goldfinch is particularly partial to the seeds of the Figwort, and it is an interesting fact that while flocks of males may often be seen feeding on their favorite seeds of the Teazles, the females usually seem to desert these plants and go to the Figworts. This is probably because the Figwort seeds are easily reached without any fear of spines, and Darwin has suggested that the slightly shorter beak of the female bird makes it rather difficult for it to reach the Teazle seed, whilst
the male can do so with comparative ease.
The plant usually known as the Figwort, or Water Betony, is the one whose scientific name is given above, and it grows plentifully by stream-sides and in watery places all over the country. There is another species, however, known as the Knotted Figwort.,

which grows mainly in woods and shady places. It is a rather smaller plant, but in most respects closely resembles its relative of the water-side.
Figwort is a plant with a stout, creeping rootstock, and a thick erect stem of a squarish shape, usually reaching a height of at least three feet, and sometimes of four or even five.
The leaves grow mostly in opposite pairs, and are rather narrowly heart-shaped, with toothed edges.
The flowers grow in erect loose panicles or clusters, and are of a very unusual shape The corolla measures about one- quarter of an inch in length, and has a broad greenish tube with reddish brown lips. The seed-capsules open widely when ripe, and care must be taken in gathering, for the seeds spill readily, and may easily all be lost.

FLAX (sec Linseed)

GOLD OF PLEASURE

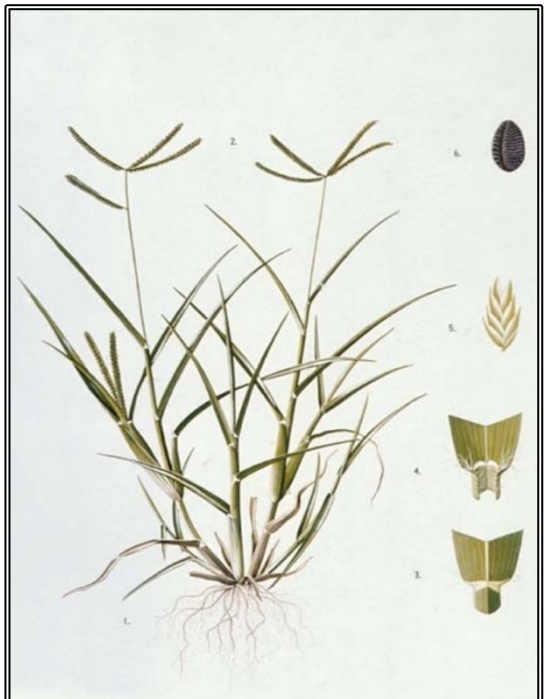
Gold of Pleasure *(Camelina sativa)*

Gold of Pleasure, or False Flax, is not a truly wild plant in this country , but is to be found in many districts as an escape from cultivation. It is grown chiefly for the oil contained in its seeds, and these have also been fairly extensively used as a food for cage birds.
Gold of Pleasure is a plant with somewhat slender stems, branched above, and reaching a height of from two to three feet. The root-leaves have fairly long stalks, but as they very soon w ither, they are not often noticed. The stem-leaves, however, are quite stalkless, and even partly wrap their bases around the stems on which they grow. They are rather narrow in form, and about two or three inches long.
The flowers appear in June and July, and grow much after the manner of those of the Shepherd's Purse. Each blossom measures about one-eighth of an inch in diameter, and is made up of four yellow petals, arranged in the form of a cross, but usually standing erectly instead of spreading out.

The seed pods are roughly egg-shaped, and are borne on slender stalks, which spread outwards. Each pod measures about one quarter of an inch in length, and contains a few long oval seeds.
As a food for birds, the seed of Gold of Pleasure has much the same properties as those of Shepherd's Purse, of which plant it is a near relative. G. E. Weston once wrote that he had heard this species rated even above Shepherd's Purse for the purpose of molting Linnets, and suggested that no praise could be higher than that.
Gold of Pleasure, says this same writer, constitutes one of the "secrets" of some old hands at Canary breeding and exhibiting. They say its use tightens and losses the plumage. It is also used to "force" hen Canaries into breeding condition, though its excessive employment is said to affect the stomach of the bird.
It is certainly a very' oily seed, and one that should always be used with care. It contains a considerable amount of sulfur in a fairly assimilable state, and while this is doubtless of great value medicinally if used only in moderation, it can easily be overdone to the detriment of a bird's health.
Gold of Pleasure is a member of the Cabbage Family of plants, and is similar in its properties to Turnip, Rape. Radish, Mustard, Charlock, etc.

GOOSEGRASS

Goosegrass. or Cleavers, is very greedily eaten by geese, but has never been very popular as a food for cage birds. It is a light-green straggling plant, covered with tiny backward-curving prickles, which enable it to cling to other plants in the hedgerow, and so support its weak and straggly stems.
Its narrow leaves' grow in rings of six or eight at intervals along the stems, and the tiny white flowers have four pointed lobes, looking like starry petals.
The fruits are about the size of tiny peas, and are covered with hooked bristles. They are green at first but turn to purplish brown when ripening. They may be gathered in plenty along most of our hedgerows during the autumn, but most caged birds are much too dainty to relish them when more delectable foods are within reach .



Goosegrass *(Eleusine indica)*

GRASS, Annual Meadow

Annual Meadow Grass *(Poa annua)*

Annual Meadow Grass is a plant that seems to be little know n in spite of its great abundance, yet it is one of the best of all our wild grasses for use in the aviary. As a green-food it is greatly enjoyed by almost all seed-eating birds, and is so easily grown that you can have little tufts of it in flower-pots, or in any odd sunny comer of the garden, at practically any season of the year.

The more of its seeding heads you pluck off. the more it makes. In fact, if you do not take away its seeds, it very soon dies.

A pinch or two of the seed merely sprinkled on the bare soil will often produce an abundance of seeding heads in the course of a few weeks.

Grasses as a class are very rich in vitamins, and are, vigorous health. therefore, of much service in maintaining.

The stems of Annual Meadow Grass may be from 6 ins. to 12 ins. in length, or even only 3 in. or 4 in., and they are always slender and weak.

The leaves are quite flat (in some grasses they are much curled), and are usually conspicuously soft and flabby.

They vary in colour from bright green (which is the most frequent) to a grayish-green or ashen tint, and are smooth and free from hairs. The tiny flowers rise up in branched clusters on wiry stalks, and these clusters may be anything from 1 in. to 3 in. in length, and may vary in colour from plain green to purplish.

When the plant grows vigorously, as it does in many of the London parts and gardens, it is easy collect large bunches at all seasons in their green- seeding stage.

Annual Meadow Grass is not only abundant in Britain, both in town and country districts, but there is hardly a single country in the world where is does not flourish. It braves heat and cold alike, and is often almost the only plant of its kind which is available at all seasons for the birds.

GRASS, Canary

Canary grass *(Phalaris canariensis)*

Canary Seed is cultivated to a considerable extent in central and southern Europe, and its seeds form the well-known Canary seed of commerce. In this country it is never truly wild, but may often be found fairly well-established round about houses and farm premises, and often springs up in one's garden from the refuse from cages and aviaries.

Canary Grass is a rather leafy upright plant, about two feet in height, and having a pretty bluish or glaucous hue to its foliage, as though covered with a blue-grey " bloom." The leaves have a typical grass like shape, and above them rise the very ornamental, almost egg-shaped heads or panicles, each one at the summit of a separate wiry stalk. These heads at first consist mainly of flat, pale yellowish scales, with broad green lines running down them, but the seeds within soon ripen if there is sufficient sun. and the heads may then be gathered and stored for future use. They need, however, a good deal of drying, or moldiness is bound to set in.

With regard to the use of Canary seed as a food for birds, the following extracts from a work (now out of print), by G . H. Boaler may be of interest.

I am given to understand that the country of origin is not officially noted in connection with the importation of Canary seed, and in this case, we must accept the vendor 's statement.

"I know of no method by which the seed can be identified as the produce of any particular country, although I am afraid the writers in some of our Fancy papers will still continue to give their praise to what they consider to be Spanish Canary seed.

"The term 'Spanish' has come to be a word descriptive rather of the quality of the seed than of the place of its origin. If a sample of Canary seed is fairly large, uniform in size, of a pale gold colour, clean and bright, we are satisfied to accept it as 'Spanish,' and deem that the possession of these qualities decides the point.

"When the outer shell is removed, the kernel is found to be of a walnut-brown colour; a number of these shelled seeds will usually be found in a sample of English seed. If the outer shell is dull and dirty-looking, or the inner skin is very light or very dark, we may know that the seed is not well ripened, has been badly harvested, or that it has been artificially dried. Many people seem especially desirous of having extremely large seed, and look with suspicion on any sample which is not uniformly large. I cannot understand the reason for this, as Nature does not produce her supplies on these lines, and we do not adopt them generally in any other department of the economy of

life. Personally. 1 hold the opinion that in Canary seed, as in other things, there is a golden mean, or happy medium, which best deserves our attention.

The analysis of Canary seed is given as follows: Water, 13.6 per cent.; Albuminoids or Protein, 13 .5 per cent.; Fats and oils, 4.9 per cent. Starch and other Carbohydrates, 51.6 per cent Ash or Mineral Matter, 2.1 per cent.

As a food, it appears deficient in Albuminoids and Fats to the extent of something like 10 per cent, which we shall find it necessary to supply either by one of the oleaginous seeds or in some other way.

E. P. S. Elfick also wrote disparagingly of very large Canary seed. "Much of the apparently large seed," he says. " is deceptive, being large only in the thickness of its husk. Canary seed, to be good should feel heavy in the hollow of the hand, as shot does, should be sweet-smelling, bright and glossy, golden yellow colour, the seed polished so that you can easily thrust your hand deeply into a sack of it, neither dirty, dusty, nor musty ; if it is either, or of bad colour or unpleasant to the palate, avoid it, and do not expect to purchase good seed at the price of rubbish, for you will not get it."

In connection with the food-value of Canary seed, it should be remembered that even the husk has at least two uses. Firstly, it provides a certain amount of fiber to give work to the muscular tissues of the alimentary canal, and. secondly, it contains a goodly percentage of assimilable mineral matter, such as phosphorus and iron, which is of immense importance in the maintenance of robust and vigorous health. Not much of the husk, of course, may be swallowed, but the little that is taken is far from being the useless matter, it is commonly supposed to be.

F Bowman has given great praise to Canary seed as an all-round food for cage birds . “This seed," he says, should be the principal article of food all the year round, as it contains more of the necessary properties than any other single seed. Many birds, kept in a heated room, require very little else, and they will certainly keep in good health for a number of years if fed on nothing but good Canary seed."

Canary Grass is an annual plant, and those who wish to cultivate it will therefore have to sow the seed afresh for the whole plant dies quite away after every year, producing its harvest of seeds

Canary seed comes first on the list of seeds used by the Canary breeder, it being impossible for him to do without it. It is to the Canary what bread is to ourselves—the staff of life. 1 advise that the seed hopper be at all times full of the best Spanish Canary seed. Let it be the staple food of your pets. It is that your birds will get both muscle and heat, it being a medium of nitrogen and carbon, and consequently is well fitted to be the prime factor in the dietary of our little pets.

GRASS, Rye


Rye Grass *(Lolium perenne)*

Rye Grass is reckoned to be the most valuable of all our British grasses, and is certainly the most extensively grown grass seed in the United Kingdom.

It is also interesting to recall that this was the very' first of our wild grasses whose seeds were gathered separately for agricultural purposes, and it has been cultivated in this country for several centuries. All this, of course, means that Rye Grass is abundant everywhere, and as its seeds are much enjoyed practically all our native birds, it is a plant that the bird-keeper would do well to become acquainted with.

Rye Grass seeds are highly nourishing and there is no need to extract the seeds from the fruiting heads, to gather this seed in considerable quantity is a matter of the greatest simplicity. If the stems are gathered when nearly ripe, and then properly dried, they will keep in fine condition the whole year through, and a few sprays will always be eagerly relished in the aviary.

The plant itself is of tufted growth, and the stalks reach a height of about eighteen inches when fully grown. The upper part of each flower-stalk bears a number of small spikelets, alternating in two opposite rows. All country children know the Rye Grass well, and can generally tell one where it is to be found in plenty. They do not know it by that name, however, but by the curious one of " Tinker-Tailor," that being the name of a much-loved game which they play by the aid of this grass all the summer in the fields.

Rye Grass seeds are about one-quarter of an inch in length, and are somewhat slender and narrow.

GROUNDSEL


Groundsel *(Senecio vulaaris)*

Groundsel is probably the oldest and best-known of all our wild food-plants for the birds, and it very well deserves, all the good names it has won. You may use it in every stage of its growth with the utmost safety, provided you exercise a certain amount of care in your choice of plants.
It is well to remember that since this plant is essentially a sturdy weed, with a constitution as hard as the proverbial nails, it loses both its " head " and its character when it grows on the rich soils of some well-kept gardens, and becomes rank in growth and depleted of virtues from such coarse plants only the seeding heads and more delicate leaves should be gathered. In fact, in any case, it is well to remove the tougher leaves from these weeds, as being of somewhat doubtful utility.
The best Groundsel plants are those which attain a height of about six or eight inches on rather poor soils, and you will usually find that even goldfinches will relish green-food of this kind, and derive considerable benefit therefrom.
They certainly take a good deal of it in their wild state, and one wonders why they are often so indifferent in captivity.
The chemical constituents of Groundsel have long been known to exercise a stimulating action on the functions of the liver and kidneys, and it is probably for this reason that its use as a green-food is so often followed by a marked improvement in many cases of intractable internal disorders.
Most folk can distinguish the groundsel with little difficulty, but there is a danger in being too sure of one's powers in this direction, for there are in some districts one or two other species whose properties are, to say the least of it, doubtful. ,
Only the seeds of such plants are safe, the leaves in all doubtful cases should be discarded.
The true groundsel (Senecio vulgaris) is shown in the sketch above, and its principal characters are its cut-up leaves (they arc ~ 7z-divided in some species), with irregular teeth, and its small cylindrical flower-heads, which become conical when the flowers have withered.
The flowers of the true Groundsel never appear to open, but this is because they consist of central florets only --there are no outer flat ones as in the Daisy.
Sometimes the plants are smooth, and sometimes hairy or even woolly, but true Groundsel is never sticky.
The viscid Groundsel is another plant altogether, and its leaves should not be used.

HARDHEADS (See KNAPWEED).

HAWKBIT, Autumnal

Hawkbit *(Scorzoneroides autumnalis)*

There are several British weeds known by the name of Hawkbit, but the Autumnal Hawkbit is one of the commonest and most useful to keepers of cage birds. Its seeds are produced in abundance during the autumn months, and are eagerly devoured bv most of our native hardbills. In the aviary, too, they are always welcome. Siskins, Twites and Bramble Finches being especially partial to them. Hawkbit seeds are rich in nutriment, and contain quite a fair amount of easily digestible oily matter.

They have been used with great success as plumage-foods, and are an excellent addition to wild-seed, mixture during the molting season.

The Autumnal Hawkbit is really a stemless plant, but the flower-stalks, which are about eighteen inches high, are often called stems by non-botanical folk. The leaves all spring up from near the root of the plant, and may be from three to nine inches in length. They are usually deeply lobed, and almost if not quite free from hairiness.

The flower-heads closely resemble those of the Dandelion in general appearance, and are about one inch in diameter. The flower-stalks of the Hawkbit, however, are not single, as in the Dandelion, but branched, so that one main stalk may bear several flowers, a state of affairs which is not found in the Dandelion. Just beneath the flower-head, the stalk is usually somewhat swollen.

There is another common Hawkbit, known as the Rough, or Hispid, Hawkbit (L.LisPid-us), which differs from the above species in having rough leaves, and in bearing its flower-heads singly upon the flower-stalks in exactly the same way as the Dandelion.

Both of these common weeds may be found in bloom in meadows and pastures from July to September, the Rough Hawkbit is usually the first to open, and is often in full flower in June.

HAWKSBEARD, Smooth


Hawksbeard *(Crepis capillaris)*

Hawksbeards are plants which closely resemble Hawkbits and Hawkweeds in their general appearance, and their feeding properties are very much the same. All these plants are distinctly Dandelion-like in their character, and their seeds, too, are of a similar structure. They all differ from Dandelion, however, in lacking the well-known medicinal virtues of that plant, and also in being of little or no use as green foods. As a general rule they produce a large quantity of feathery seed-heads, and the seeds are great favorites with most of our British birds.

The Smooth Hawksbeard is the commonest of all the species, and has branched stems rising to a height of about two or three feet The leaves have backward-pointing lobes after the style of those of the Dandelion, but those which grow upon the higher pan of the stem are long and narrow, and embrace the stem with their bases.

The flower-heads are like small Dandelions, generally measuring about half an inch in diameter. The fruiting heads are white and feathery. The Smooth Hawksbeard is an annual plant, and grows mainly in waste places and cultivated ground, where it flowers from June to October.

In many parts of the country, especially where the soil is of a chalky character, a nearly related species known as the Dandelion-leaved Hawksbeard grows abundantly in the fields. The stem leaves of this plant, however, are deeply cut. and the flower-heads measure about an inch across . The seeds are ripe from July onwards.

HAWKWEED, Mouse-ear


Hawksbear Mouse-ear *(Pilosella officinarum)*

Most of our British Hawkweeds show a distinct family likeness to the Hawkbits and the Hawksbeards (for notes on these plants, see under separate heads), and the commonest and best-known species is the Mouse-ear Hawkweed, which grows abundantly in meadows, pastures and waste places in practically every part of Britain, flowering from May to August.

Mouse-ear Hawkweed, sometimes called simply Mouse's-ears, has stems which lie flat upon the ground. and creep over the surface in all directions. The leaves are about two inches or so in length, are downy beneath, and covered with rather long conspicuous hairs above. In shape and hairy character, they are supposed to resemble the ears of the animal after which the

plant is named. The flower-heads grow each on a separate stalk, as in the Dandelion, and these stalks are usually about six inches in height, though they may be much more or very much less, according to the character and richness of the soil in which they grow. The heads themselves are considerably smaller
than Dandelions, their average size being about one inch in diameter. They are of a very pale sulfur yellow colour, and the undersides of the florets are often tinged with pink.
The Mouse-ear Hawkweed has globular feathery seed-heads of the same character as those of the Dandelion, but the hairs of which these downy balls consist are brown instead of silky-white, and this feature enables them to be distinguished at a glance. Hawkweed seeds possess no particular medicinal virtue, but are the natural food of a vast number of our native birds during the late summer and autumn months, and are always greatly appreciated in both cage and aviary.

HAWS (See HAWTHORN).

HAWTHORN


Hawthrorn (Crataegus monogyna)

The Hawthorn, or May, is one of our best-known trees of the hedgerow, not only on account of. Its dense snows masses of flowers in the fullness of the spring, but equally so because of its abundance of crimson fruits, or Haws, which deck its branches all through the autumn months, and provide many a welcome feast for the birds right up to the close of the year, or even later.
Hawthorn berries arc the special food of the Hawfinch, and it is fairly safe to say that he loves nothing better in the world of diet than a feed of these stony fruits. It is not, however, the fleshy portion that he seeks, but the tasty kernel that is hidden in the heart of the core, or stone, of the Haw.
It is always a fascinating sight to see birds strip off what we call the edible portion of the fruit, and then work open in an admirably business-like manner the hard shells which encase the kernels. It may well be, no doubt, that the amount of actual nutriment which the bird secures from a handful of berries is exceedingly small, but the enjoyment is obviously great, and even for this reason alone, and for the healthy and natural occupation thus provided, every effort should be made to supply this bird regularly with one of his favorite foodstuffs throughout the whole of the season when they are obtainable.
Hawthorn berries are remarkable for their long-keeping properties, and often hang upon the trees until a new crop of fruits is formed. Long before that time, of course, they are shriveled and uninviting, but the fact remains that they show practically no

tendency to decay. A large branch kept in water in an outhouse will provide fresh, soft berries over a long period or the berries themselves may be gathered in bulk from the trees and bushes along the hedgerows, and stored in air-tight tins or jars until they are needed.
Bullfinches, Green finches, and other cage birds often welcome a feed of freshly-gathered Haws, and many of the Thrush tribe revel in them.

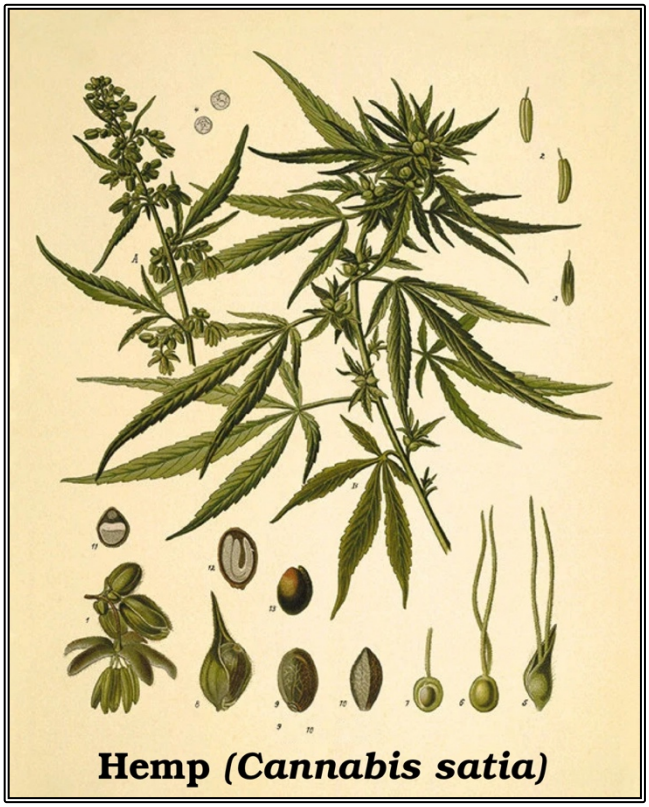
HEATHER


Heather (*Calluna vulgaris*)

Heather is a plant that could be used by bird-keepers to a far greater extent than it is, especially since where it grows at all, it usually covers vast areas of ground, and so can be gathered in large quantities in a very short space of time.
Bird feed eagerly upon the tender young shoots of this plant, but the seeds, too, are greatly enjoyed by Bullfinches and other small seedeaters. The Heather, indeed, seems almost a special provision of Nature for the birds' winter food, for the abundant seed, instead of being scattered widely by the autumn winds, remains upon the plant tor many months.
This means, of course, that there is no need, when gathering: heather, to be careful about losing the seed. If the plants are gathered shortly after the flowers have faded and turned brown, and then hung up in a dry airy place, for a time, they will be in a fit condition for supplying seeds during the whole of the winter.
So far as Heather-seed in the aviary is concerned, there are few birds which can resist it. but above all has received greatest praise when given to Bullfinches as a preparation for the breeding season. It is said to have a peculiarly beneficial effect upon the hen birds at this time. It is unfortunate that the name Heather, which well-known to everybody, has been applied to quite a number of totally different plants, including Restharrow, and a number of the Ericas, or Heaths. There is, however, only one true Heather, and that is the plant known botanically as calluna vulgaris, which in some districts is also popularly called Ling. The plants known as Bell-heathers are really Heaths, and are very different in structure and appearance (though the seeds and tops of some of these, too, are also eaten by birds).
A sprig of the true Heather is shown in the illustration. Its stems are quite woody and much branched, and reach a height of from one to two feet—tall often considerably more than this on some of the wilder moors of the North.

The leaves are very tiny, seldom reaching as much as one-twelfth of an inch in length, and overlap one another so tightly that the stems of the plant look square, for the leaves grow in regular opposite rows along the stem.
The well-known purplish flowers appear from July to September.

HEMP


Hemp *(Cannabis satia)*

The Hemp plant is not a native of Britain, though it may often be found springing up in waste places from seed which has been thrown out. but it seldom ripens its seed in this climate, though it is largely grown the Continent and in America
Hemp is quite a large plant, and some varieties, even in this country, reach a height of six feet or more. The flowers arc of two distinct kinds, one being male, and the other female, and as the sexes occur on different plants, it is, of course, only the female plants which bear any seed.
The stem of the Hemp is square, and the leaves are divided into fine narrow segments, which give the plant a distinctly handsome appearance. The flowers are small and greenish, and remind one of those of the common Hop and the Stinging Nettle, to which plants the Hemp is nearly related.
Regarding the use of Hemp seed as a food for cage birds, the following extracts from a work (now out of print) by G. H. Boaler may be of interest :
" In the United States of America, Hemp is grown for the seed alone, like Maize, and yields from 25 to 34 per cent, of a fatty oil, which is used in the manufacture of paint, varnish and soft-soap. It is also largely cultivated in Holland, Sweden and Russia. The Colonies also send us extensive supplies.
The best Hemp seed is of a grayish brown colour; on the outside of the husk, the inner cover or skin shades from white to a dark olive green over the germ of the seed. The kernel itself is white, and of a nutty appearance and taste. The seed of which the husk is a light green m colour is unripe, and which is very dark in colour and very light in weight has probably heated in storage, and should be avoided.
The analysis of Hemp seed is given as follows: Water 12.2 per cent., Albuminoids or Protein 16.3 per cent. Fats and Oils 32.2 per cent. Starches and other Carbohydrates 16.2 per cent. Ash or Mineral Matter 4.3 percent.
Hemp is very nourishing, fattening and warming, and for this reason is more serviceable as a winter food. Care is necessary in crushing Hemp seed that the outer shell is not ground up with the kernel. I am told that this outer shell contains some quantity, small, of course, of an irritant poison, and that if the dry outer shell could be removed, and treated in the same way as Pyrethrum, it would yield an equally good insect-powder.

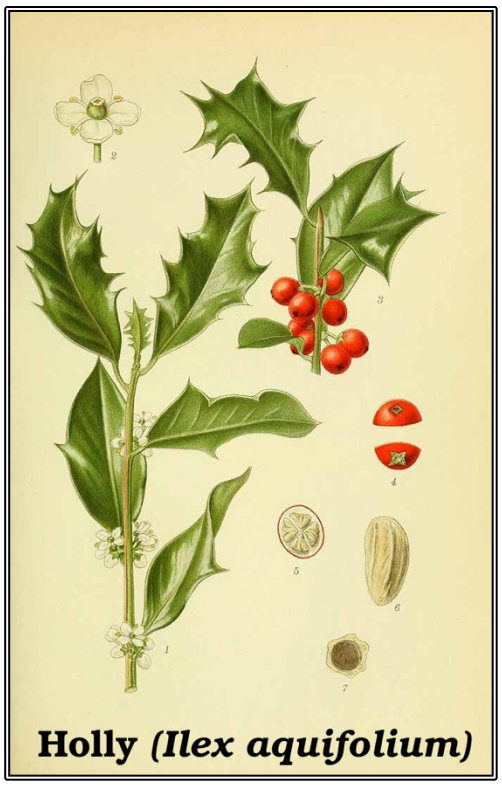
If this is so, we may look to the presence of the ground- up shell as the cause of the ill-effects so often attributed to the use of the seed when crushed for feeding young birds.
The Hemp plant is never overrun with weeds, but, on the contrary, destroys them. This is attributed to a peculiar poisonous quality in the root by some, whilst others state that it absorbs all nourishment from the and leaves nothing for the weeds to thrive on.
It is also credited with the property of destroying caterpillars and other pests which are inimical to vegetable life, and in countries where Hemp is much grown it is a common practice to encircle the vegetable garden with a border of this plant.
The leaves of Hemp grown in Eastern and tropical countries possess strong narcotic qualities, and form the basis of a well-known Turkish intoxicating drug called Bhang or Hashish. It is related of the Hottentots also that they like nothing so well as smoking, but tobacco not being sufficiently strong, they chop Hemp leaves very' finely and mix with it.
These narcotic and intoxicating properties, however, do not usually develop in English-grown Hemp, which very' rarely exudes appreciable quantities of the resinous secretion in which these properties reside.
Hemp seed, “wrote E. P. S. Elfrck " is nutritious, fattening, and a most important food for birds in winter, and during the breeding season ; in fact, I do not think caged birds can do without it. For young Canaries when separated from the parents it should be used with great discretion. Some breeders, including Wallace, arc of opinion that when given freely to nestling it is apt to engorge the liver, if so. congestion ensues, and in the early days of molt you may expect to lose by atrophy some promising songsters.
When purchasing this seed, see that you get it of a good medium size, silvery looking in its brightness, and clean and sweet. For young Canaries and for freshly- caught Goldfinches it must be
Crushed fresh every day, I a course set mill or with a roller.”
The opinions of Fanciers still differ widely respecting the merits and demerits of Hemp seed, (quite a number of long-experienced breeders, as F. Bowman has remarked. " refuse to give Hemp during molting, claiming that the excess of oil tends to darken the feathers of birds that are fed on it. It is. however, a very useful seed during the breeding season and winter months, as it is very nourishing and fattening. Many hens will feed their young on nothing else, and young birds seem to thrive on it, even without the use of egg- food.
" Too much Hemp seed," wrote Dr. Bechstein, "is prejudicial to all birds, and must therefore be given them sparingly; for, when too frequently fed upon it, they become hoarse and blind, and frequently die of consumption."
C. A . House once wrote: " Hemp seed is much abused, and at one time I was amongst those who abused it. Time, that unerring monitor, however, has taught me differently, and I have proved that, used at the right time, in a right manner, and in right quantities, it is a most valuable seed ... if used in a moderate way, it is of much service, especially during the breeding season and the cold months of January, February and March.”

HIPS


Dog Rose *(Rosa canina)*

The fruits known as Hips are produced by various species of Rose, of which the commonest is the well-known Dog Rose, of our English hedgerows. There are several other somewhat similar species, .an enumeration of which is unnecessary here, for their properties are all practically the same.
Hips are no great favorites with birds in confinement, with the single exception, perhaps, of the sturdy Hawfinch, but in their wild state they are often opened and partially devoured by a number of hungry Finches during the winter.
The great drawback to the use of Hips as a food is that they contain a number of irritating hairs as well as their seeds and pulp. The latter is sweet and delicious, even to the human palate, when the fruits are ripe, but if through carelessness one takes the hairy matter into one's mouth, the effect is most unpleasant, and it may be a somewhat similar experience that deters many birds from taking Hips at all freely. The fruits themselves, however, are thoroughly wholesome in character, and are doubtless useful as an occasional blood-purifier and tonic to those birds which delight in them. They
also contain, of course, quite a fair amount of rich coloring matter.

HOLLY


Holly *(Ilex aquifolium)*

Holly berries often form the principal fruit- food with birds of the Thrush tribe during the winter months, and as the\ are produced in such abundance practically all over the country, they might with advantage be use by aviarists to a far greater extent than then usually are.
One of the greatest advantages of using Holly berries is that you can be quite certain there is no suspicion of poison about them, and another is that there is no difficulty whatever concerning identification of the tree.
Holly, moreover, belongs to a family of plants which are famous for their medicinal virtues. "The well-known Paraguay tea. which is used so widely throughout South America, is made from a species of Holly, and the leaves of our own tree have been much used as a substitute for tea by the peasant classes of Continental countries. They have also been employed in place of

quinine in cases of fever, and the plant is known to possess wholesome tonic properties. It has sometimes been asserted that the berries are poisonous to man, but our standard works include no authentic cases of ill-effects having been produced.
On some birds, Holly appears to have a distinctly astringent action, and has been used with great benefit in cases of unnatural looseness of the bowels.
Usually associated with Holly is the equally well-known Mistletoe, though it is far more local in its distribution. It is, of course, wholly a parasite, and it is quite impossible to cultivate it in ordinary garden soil. Its natural home is upon some fairly large tree, such as apple or poplar, and in some of our apple orchards it is a great pest, sapping the juices of the trees, and seriously damaging the crop of fruit .
Mistletoe berries are injurious to human beings, but the plant is often used as fodder for animals on the Continent (where it flourishes abundantly), and birds of many kinds seek and devour the ripe fruits eagerly.
Not only the Missel (or Mistletoe) Thrush, but: practically all birds of the Thrush tribe, delight in a feed of ripe Mistletoe berries, and the Starling is a real glutton for them.
It is well to remember that, although the Mistletoe may be found in flower as early in the year as March or April, its berries are seldom truly ripe when the plants are gathered for Christmas decoration. Hence it is generally useless to attempt to grow the plant from the seed 's in these berries.

HONEYSUCKLE


Honey Suckle *(Lonicera periclymenum)*

Honeysuckle is a plant which bird-keepers might, with advantage, use far. more freely than they do. It is the berries of course, no use in its green state, but when are ripe they are great favorites with most of our native birds.
Although the Honeysuckle flowers are known to everyone, very few people can tell you what the berries are like. They may be found freely enough along the autumn hedgerows, but are usually passed by as something poisonous or at least regarded with suspicion.
Yet as a colour- food there is probably nothing, not even the Rowan itself, which can surpass the luscious fruits of this common plant, and they are taken with great relish, not only by such birds as the Thrush and the Bullfinch, but also by the Blackcap and other Warblers. In fact, they are such favorites with many of our native birds that they are amongst the first of the fruits to be cleared from the hedgerows.
So valuable, indeed, are the berries of this plant to the bird-keeper that it is always well to make a note of a spot where the Honeysuckle flowers freely, so that its crop of fruits ma\ be gathered before the wild birds have had their fill.

It has often been said that Honeysuckle berries, by their very lusciousness, decay and fall very quickly, but such is by no means the case. If they are left alone, they hang on the branches for months, and if you gather these branches carefully, you may hang them up at home for a long time, and so have them always ready at hand as required.
In its flowering stage the Honeysuckle is known to everyone. Its thin stems twine up trees and hedgerows to a height of a dozen feet or more, and often terribly deform the branches by their snake-like grip.
The leaves grow in opposite pairs (see illustration), and usually have very short stalks, or none at all.
The fruits occur in dense, small clusters at the ends of the twigs, and are a beautiful bright crimson when fully ripe, reminding one of the well-known red currants of our gardens.
Honeysuckle grows readily enough on almost any soil, and is a plant that might with advantage be introduced more freely into the garden of anyone who is interested in the feeding or breeding of birds.

INGA (see NIGER).

IVY

It has often been said that birds never eat the berries of the Ivy, and some have gone so far as to say that they are actually poisonous, though anyone who has watched our native songsters in their natural haunts knows perfectly well that Ivy berries possess great attractions as a food.
Beneath my window, as 1 write, is a large tangled mass of this plant, which produces an abundance of fruits every year, and when once Thrushes and Black-birds discover them, they pay their visits unceasingly until the whole crop is cleared.
The mistaken notion has probably arisen from the fact that the Ivy is one of the latest of all our wild plants to burst into flower. October being the usual month of blooming; this means, of course, that the berries themselves are very late in ripening and consequently. are not attractive when most of our other wild fruits are at their best.


Ivy *(Hedera helix)*

Ivy berries are never ripe at Christmas time, and should not be gathered until they have quite lost their green coloring and changed to a rich purplish black.
This change is usually complete about February or March, and if Ivy-covered trees are watched with patience at that season, there need be little doubt in the observer's mind regarding their attractiveness for birds.
Gilbert White knew this very well, though his observation concerning it seems to have attracted little or no notice from bird-keepers. In his famous Natural History of Selbome. he says, " Ivy berries afford a noble and providential supply for birds in

winter and spring, for the first severe frost freezes and spoils all the Haws, sometimes by the middle of November, Ivy berries do not seem to freeze."
Nowadays, of course, we seldom get frost sharp enough to spoil Haws, even in January, and should look upon frozen Haws in November with more surprise than we should roses and ripe strawberries from the garden, but the reason why Gilbert White's Ivy berries did not seem to freeze was probably that they were still hard and green.
Ivy berries have probably gained a bad name, too, because children have suffered painful symptoms after eating them, but the human economy is very different from that of the birds, and there is no doubt that for these latter they are a very wholesome and attractive article of diet.

KNAPWEED, Black


Knapweed Black *(Centaurea nigra)*

Black Knapweed is one of -the most useful of all our wild bird foods, and one of the easiest to gather.
Anyone who has watched the ways of the Goldfinch in its natural haunts will not be surprised at the great fondness shown by this bird for Knapweed when in the cage or aviary. There is hardly any food that he will take with greater relish.
Common local names for Black Knapweed are Hardheads. Ironheads. and Horse-knobs, and under one or other of these names at least a few folk in most country villages can tell you where the plant grows in plenty. It thrive in most meadows, pastures and waste places all over Britain, and may be found in flower from June to September.
The Goldfinch, however, is not the only bird for which you will gather Hardheads, for practically all our British seed-eaters relish this seed as much as he does, and benefit to a like degree by having it included in their diet.
When the seed-heads are ripe and dry. they may be gathered and stored just as they are. Without taking any trouble to liberate the seeds. If you open a fair number of these heads when freshly gathered, you are certain to find within some of them a number of small fat grubs. If the heads are given to the birds in this state, they provide not only both grain and insect fare, but much useful and enjoyable occupation to the inmates of your aviary.
The stems of the Black Knapweed may reach a height of anything from one to three feet, and are usually grooved and branched.
The leaves grow in a very irregular fashion, and vary' greatly both in size and shape. They are mostly rather long and narrow, and some of them have a few distinct notches

or lobes along their edges. The lower ones have quite distinct stalks, but the upper ones grow directly upon the stem without any appearance of stalk at all.
What are commonly called the "flowers" of this plant are really composite flower-heads, much resembling, both in appearance and in structure, the similar well-known flower-heads of the thistles.
The individual florets which make up ,the head are quite small, and of a bright reddish-purple colour.
Below them is the globular, blackish "head" or "knob," from which the plant has derived its popular names.

KNAPWEED, Greater


Knapweed Greater *(Centaurea scabiosa)*

The Greater Knapweed is a near relative of the Black Knapweed (see above), but is readily distinguished by its larger size and stouter stems, its much more deeply cut leaves, and most of all by its handsome flower-heads of rich crimson-purple, which are treble the size of those of the other plant, and equal in beauty many of the cultivated flowers of our gardens. Greater Knapweed is more a plant of the wayside than of the meadows, and is usually not quite so abundant as the Black Knapweed, which often turns meadows to sheets of purple. It is in bloom from June to September, and ripens its seeds from August onwards. Like the smaller species, this plant is often known as
Hardheads or Ironheads; it is also called Matfellon.
"The Knapweeds or Hardheads," wrote G. E. Weston, "are a great help to the keeper of the fascinating goldfinch. It is safe to say there is nothing he likes better; and a daily feed for fresh-caught specimens is of inestimable value in 'seeding them off.
Hardheads are also well liked by most other British seed-eaters, and a supply of heads filled with ripe seed (frequently also with valuable grubs or maggots) is easily gathered and stored for use. A handful or two thrown into the aviary will meet with a warm welcome, and Canaries are not backward in appreciation. For Hybrids and Mules, they are great, for they are, like Thistles, both food and
wholesome occupation."
Greater Knapweed is a perennial plant, and if taken up bodily by the roots in the late autumn months, and transferred to a sunny spot in the garden, it will grow very readily, and produce each year not only a useful supply of seeding heads, but a showy succession of attractive blossoms during the early summer season.

KNOTGRASS

Knotgrass *(Paspalum distichum)*

Knotgrass is an inconspicuous weed that is very little known by country people, though it is very widely distributed, and grows so abundantly that its seed may be gathered in quantity with unusually little trouble.
In its wild state. Knotgrass is a favorite food with most British seed-eaters. Bullfinches and Linnets in particular seeming to be especially partial to it .
One of its great claims to our notice is its remarkable healing effects upon the kidneys. It is a herb that is widely used medicinally in sanatoria on the Continent, especially in Germany, where the most extraordinary cures are recorded to have been effected by its use.
The name Knotgrass is a very misleading one to non-botanical people, for this plant is not really a grass at all, nor is it in any way related to that tribe of plants. It does not even resemble grass in appearance, and it is difficult to understand why it was ever branded with so inappropriate a name.
Its real-relationship is with the well-known Docks of the cornfields, and though it is a much smaller plant than most of these, its seeds are almost exactly the same in size and appearance. They are little reddish brown triangular nutlets, and may be found clustered together in the angles formed by the leaves and the stems.
Knotgrass varies much in size. Sometimes it is an almost erect plant, about six inches in height. At other times its stems may be a yard in length, in which case they lie Hat upon the ground and branch out in all directions.
This latter is the usual form of the plant in cultivated fields, and a single root of it may cover quite a large area, and will provide a surprising!) large quantity of seeds.
The leaves of Knotgrass are about an inch in length, and grow , as will be seen in the illustration, alternated) the stems. Each one has a little piece of silky membrane, called a stipule, at its base, and this often becomes ragged and conspicuous.
The flowers appear from May to October, and always arise at the bases of the leaves. They are never more than about one-eighth of an inch in diameter and vary' in colour from white to pink or crimson, occasionally they' are quite green. The seeds are ready for gathering from June onwards.

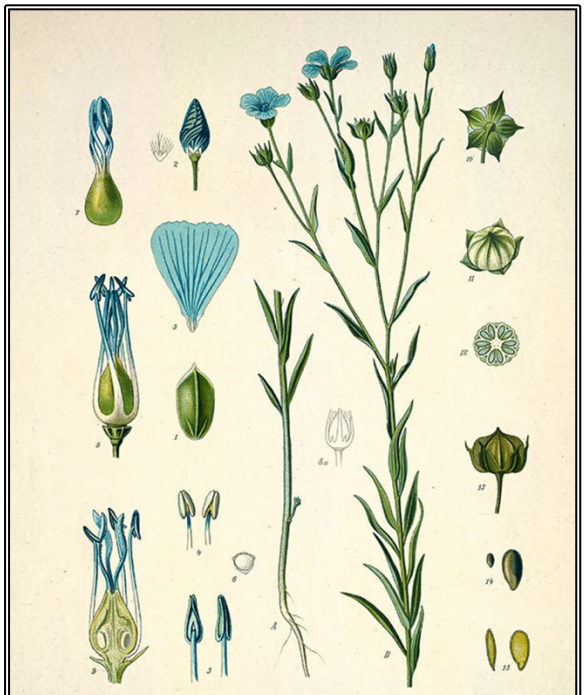
LETTUCE

The seeds of our common cultivated Lettuce plants are of great value as a food for caged birds, and contain in addition a considerable amount of medicinal matter. "Lettuce seed," wrote G. H. Boaler, "is cooling and cleansing, and is particularly recommended for Goldfinches, but we must be careful to have 'live' seed; that of a light

gray colour, although more expensive, is the best, and the result is more satisfactory, as the particular qualities required are necessarily absent from dry seed which has lost its germinating properties. It is said to be very useful both before and at the end of the breeding season for Canaries as well as Finches."
Lettuce seed has been used with marked success for reducing undue fatness. It has a rather definite purgative action, and produces a cooling effect upon the blood. For wheeziness also it has often been recommended, and certainly it has a most beneficial effect on various voice-troubles, possibly because of its tonic action on the system as a whole.
The Lettuce plant is rich in mineral constituents of a nutritive and medicinal nature, and of its total material of this kind about 37 per cent, is potash, 7 per cent, soda, 14 per cent, lime, and 6 per cent, magnesia. There are also considerable amounts of iron and phosphorus, the Cabbage Lettuce in particular being especially rich in iron, and therefore of great value in maintaining a healthy condition of the blood.

LING (See HEATHER).

LINSEED


***Flax* (Linum usitatissimum)**

The common Flax plant, from which our Linseed is derived, is not really a native of Britain, though it may often be found growing apparently wild in the fields, where it
is in flower from June to early August.
Flax is an annual plant with straight round stems, about eighteen inches or two feet in height, and branched near the summits. The leaves are very narrow, and grow alternately along the stems. They are usually about one inch in length. The flowers have five petals and five sepals, the former being about two-thirds of an inch long, and of a pretty blue colour, and the latter having three veins.
With regard to the use of Linseed in the aviary, the following extracts from a work (now out of print) by G. H. Boaler may be of interest " I am informed that the largest seed is extensively used in racing stables, and that it is given to horses to improve the appearance of their coat, to which it imparts a gloss not easily obtained by other means, and that it increases their staying power. It is recommended by many bird fanciers for producing similar effects on birds; it is very' nourishing, and is peculiarly useful during molt, when it may be given freely, as its properties are demulcent, exercising a highly beneficial effect on the respiratory organs, and strengthening the system, and it will be found invaluable for producing fineness of feather; but, as with other oily seeds, care must be taken that the proper balance between Albuminoids, Fats and Carbohydrates is maintained, and the seed must be

in good condition, clean and sweet or the birds will suffer rather than benefit by its use.

This seems to be particularly the case with Linseed, which contains a larger proportion of oily compounds than animals can readily assimilate, so that it frequently happens that a portion will pass through the animal in an undigested condition. This will, of course, have been quite useless as food, and may possibly to some extent have upset the digestive organs through its presence in excess in the stomach, and may also act as a direct purgative. In the case of young birds this is particularly noticeable, and I have heard experienced fanciers express the opinion that it has been the direct cause of death, because, in addition to the large quantity of oil, this seed also contains a large percentage of mucilaginous matter.

Linseed, therefore, ought always to be administered in comparatively small quantities, and mixed with other seeds which are deficient in oily compounds, so as to maintain the balance between the two great elements of nutrition-heat-giving and flesh-forming compounds. Unless this is done, we cannot maintain our birds or any other animals in vigorous health. One eminent fancier, and a practical authority on bird-feeding, tells me that during his birds' molt he always makes it a practice to mix Linseed and Canary seed in the proportion of one part of the former to eight parts of the latter. It has been stated on several occasions that Canaries will eat Linseed most freely during the month of March), and that many birds will not touch it at other periods of the year. If this is so, their instinct would appear to endorse the medical practice of giving Linseed in its various forms for the prevention and cure of the troubles arising from the prevalence of the trying easterly winds, which we usually experience about March." It is well to remember that the mere presence of the mild demulcent oil of Linseed in the alimentary canal of the bird exercises a most soothing effect, and when there is any tendency to intestinal irritation, this seed is often of great value.

Linseed, too. is very highly nutritious, and is said to contain over one hundred grains of proteins to the ounce. This means that it is far more nourishing than wheat, which contains only about sixty grains, or oats, which contain seventy grains, or buckwheat, which usually contains only about thirty of forty grains. Even fresh hens' eggs contains less than sixty grains of protein to the ounce, so that Linseed must always be looked upon as a highly concentrated food-stuff. It is. indeed, said to be by far the most nourishing of all the seeds used in the aviary-. and is more likely, therefore, to produce its best effects when given in strict moderation.

In C. A. House's well-known Canary Manual, the author speaks of Linseed as being very fattening and full of oil. " It is," he says, " also very valuable to the Canary fancier from the fact that it is such a grand demulcent, softening and mollifying any inward irritation that may be set up in the intestines; further, it is a splendid seed for keeping birds in the very pink of condition, producing, as it does, the wonderful luster and beautiful brightness of coat that it so much coveted on the show bench."

It is important to remember that the high praise which has been given to Linseed as a food tor birds applies only to the best fresh seed, the grains of which are large and bright, and perfectly sweet to the taste, without any trace or suggestion of rancidity. When the seed is old, or improperly harvested, chemical and other changes may have destroyed the majority of its virtues, and though inferior seeds are frequently offered at very tempting prices, it is economy of the falsest kind to be led into using them.

MAWSEED

Poppy (Papaver somniferum)

In spite of much that has been written to the contrary, Mawseed is simply another name for Poppy seed. There is no such plant as " Maw," as many folk seem to have supposed; the word is merely another name for the craw or crop of a bird, and of course refers solely to the use to which the seed is put, and not in any sense to the plant from which it is derived.

The Mawseed of commerce is practically all produced by the species of Poppy known botanically as Papaver somniferum, which is probably a native of Persia, but

is extensively cultivated in many pans of the world. It is the common white poppy of our gardens, and the opium Poppy of the herb fields, for both are really the same species, though the plants are very variable in character.

Dr. Royle described the opium Poppy as follows: " The plants are from two to four feet high, the stems are round and straight, glaucous, smooth, with a few hairs towards the White and tapering extremity, and on the peduncles (flower stalks). The leaves are large, sessile (stalkless), arnplexicaul (embracing the stem), smooth, of a glaucous (or grayish) green, margins wavy, cut and toothed. The flowers are large and terminal, drooping before flowering, with smooth concave sepals; four large petals: roundish in form, white or of a purplish color, with a dark-colored spot near the claws(i.e., the narrow base). The capsule is oval, or nearly globose, large, smooth, containing numerous white or brownish colored kidney-shaped seeds. Flowers in June or July, and the capsules ripen about two months later.

Papaver somniferum is, of course, a poisonous plant, for it provides the deadly opium and morphine and other potent drugs. Even the Poppy heads one buys at the chemist's contain a small amount of morphine, and act in much the same way upon the system as opium itself would do. The seeds, however, arc quite free from suspicion, and the oil which they contain is of a very mild and gentle nature.

" Opium." says Dr. Royle. " is obtained by a very simple process, consisting merely in making incisions in the evening into the capsules of the Poppy, shortly after the petals fall off. taking care not to penetrate into the interior, when a milky juice exudes, and either concretes upon the capsule, whence it may be taken off in little tear-like masses, or earlier in the morning in a softer state. . When thus collected, the opium requires nothing more than being dried in a warm and airy room." The seeds, therefore, are of no use to the opium-maker, and so find their way on to the market as the familiar Mawseed of the bird-food dealer.

In a little book (now out of print) on the subject in question, G. H. Boaler writes of

Mawseed as follows: " Of all the seeds, Maw is one of the most valuable to the birdkeeper. It is practically the first seed the young bird eats. We sprinkle it in the sand to teach the young Canary to pick up, and in the final stages of senile decay, the old bird seems to relish a little Mawseed better than anything else. Then we have no other seed so good for the double effect of correcting both constipation and looseness of the bowels.

The analysis of Mawseed is given as follows: Water. 14.6 per cent.; Albuminoids or Proteins, 17.5 per cent.; Fats and Oils, 40.3 per cent.; Starches and other Carbohydrates 12.2 per cent.; Ash or Mineral matter 5.8 per cent.

The plant is cultivated for the milky secretion obtained from the capsules and from which opium is made, and the seeds taken from the capsules yield 40 per cent, of oil of a bland golden colour which is bleached by exposure to the sun, and is said to be largely used to adulterate almond and olive oils. It is also used in cooking as salad oil, and in the manufacture of paint and soaps, and occasionally for lighting purposes.

It is agreed that the seeds have but little narcotic effect (probably none), and I am told that in India a coarse kind of bread is made from the dry cake which is left after the oil has been extracted."

Poppy oil (a bland fixed oil contained in the seeds) is." wrote E. P. S . Elfick. " as sweet as olive oil. and is used for similar purposes. The opium is not. as in the case of many other vegetable alkaloids, transferred to the seeds, as they are altogether devoid of any narcotic principle if this seed is good. . . The birds, when feeding on good Mawseed, as in the case of Rape, leave all the husks in their seed-vessels."

There seems to be no doubt whatever about the wholesomeness of the oil contained in Mawseed, for even very young birds obviously benefit greatly from its inclusion in their diet. It seems, more than any other article of food, to ward off a troublesome tendency towards diarrhea and other intestinal disorders, and is so readily digested that it forms an admirable preparation for dealing with harder seeds.

" Maw or Poppy seed," says C. A. House. "I am particularly well disposed towards, tor the benefit of the birds. It is very nourishing and comforting, being rich in oil. Its medicinal properties are also very great, so much so that it will often cure diarrhea without the aid of any drug.. . . I have derived so much benefit and advantage from the use of Mawseed that I unhesitatingly advise all Canary breeders never to be without it. In addition to its other properties, it is, in my opinion, a great and valuable aid in conditioning birds."

When Mawseed is in good condition it is absolutely free from musty taste or smell, and sweet, oily and pleasant to the palate. In this state it can always be used freely without any fear of ill effects.

MEADOWSWEET


Meadowsweet *(Filipendula ulmaria)*

Meadowsweet is a tall plant, often three of four feet high, and carries a number of large leaves which bear a slight resemblance to those of the common rose tree of our gardens. It is, in fact, although so very different in many ways, a near relative of the roses, and like them fills the air around it with a powerful fragrance.
The flowers grow in dense clusters at the summits of the stems, and though the individual blossoms are seldom more than a quarter of an inch in diameter, the clusters themselves may be six inches long, or even more, and so make a handsome show, which reminds one very much of the cultivated Spiraeas of our gardens. They are of a pretty creamy-white colour, and of almost almond-like scent.
Meadowsweet is in bloom from June to August, and grows almost wholly in damp places and by river sides. Its seeds are usually' ripe about September, and are then much sought after by all the Bullfinches in the vicinity. Meadowsweet seed is a most valuable aid to the British bird fancier, and has been highly praised for its good effects during the molt.
Not the least point in its favor is the ease with which large quantities can be gathered , The plant itself nearly always grows in dense masses over large areas, being of a distinctly "social" habit, and its great clusters of seeds enable one to fill a collecting bag in an unusually short space of time.

MILLET

Millet is a general name for many plants of the genus Panicum. the best known of which is the famous Panicum miliaceum of Africa and the East. They are all plants of a grass-like character, and often produce exceedingly small seeds, though the plants themselves may be twelve feet or more in height, they' are largely cultivated in lands where little rain falls, and where the soil is too dry and poor for the successful growing of wheat and maize. In the Crimea, Millet is used for making a drink called buza, which is a fermented liquor of the nature of weak sherry.
"The best White Millet which we have in commerce," Mites G. K. Boaler, " is Panicum miliaceum; this is a plant about four (or more) feet high, which will ripen as far north as South Germany, or wherever wine can be successfully produced. It probably came originally from the south of Asia. This variety has undergone some

changes, in consequence of climatic and other influences in the various countries in which it has been, grown, so that we now have the seed white, black, red, grey, or light brown in colour of the outer shell. The white seed is held in the highest esteem.

Proso Millet *(Panicum miliaceum)*

Next, we have the ordinary Spray Millet, grown principally in France and Italy. This is called Panicum italicum or Setaria italica. The seed is yellow, differs somewhat in shape from, and is smaller than, the ordinary White Millet. These sprays are in two distinct varieties; on one the seeds are grouped in the form of a bunch of grapes, and on the other like a little rosette.

Then we have the Hungarian Millet, Panicum or Setaria germanicum, the seed of which is similar to, but slightly lamer than, the Italian, and rather a darker brown in colour. This variety is also cultivated in California, where its seed assumes a gray colour, and is generally known as Mohar. or German Millet.

There are other varieties, very small indeed, which rarely come into commerce. The most familiar of these will be the small variety known as Panicum miliare, or Indian Millet. The White Millet is, however, I believe, the variety which is properly entitled to this designation, it being known as Chena or Indian Millet, and cultivated on the Deccan, and to an elevation of 11,000 feet in the Himalayas.

Panicum miliare, the small-seeded Indian Millet, is chiefly imported from Hungary, and forms an important item in the dietary of some of the smaller foreign birds.

Millet seed is very rich in Starches and other Carbohydrates, containing 61.5 per cent., whilst Fats and Oils are represented by 5 per cent. only. Albuminoids, or Proteins, 15 per cent, Water 13 per cent, Ash or Mineral Matter, 1.6 per cent. From the analyses which I have been able to compare, a good sample would appear to be about equal in both Albuminoids and Fats to Canary seed, but the very large percentage of starchy matter points to the desirability of adding to the rations of our birds a further supply of Albuminoids and fats.

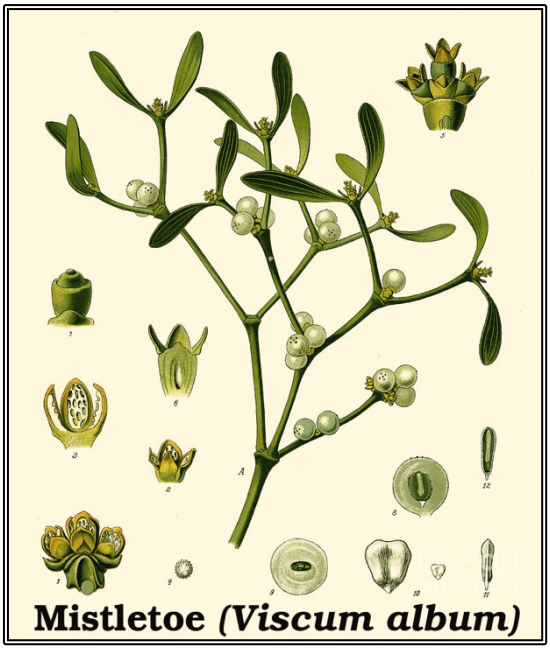
This latter is, perhaps, the principal point to bear in mind concerning the use of Millet as a bird food. It is essentially an unbalanced article of diet, and for that reason should never be used without a proper admixture of other ailments. For this very reason, however, as F. Bowman has pointed out, Millet is of considerable value where birds have been fed too liberally on rich and fatty foods, as it exercises the stomach and gives nutriment, but, owing to its remarkably low oil-content, it does much to restore a normal balance in the metabolic activities of the birds.

So far as Canaries are concerned, it is interesting to quote the opinion of C. A. House. "I never use this in bulk. It contains such a small percentage of nourishment as to be absolutely useless to the Canary breeder. Spray Millet is useful for hanging in aviaries. It gives the birds something to amuse themselves with, and thus often

acts as a preventive of cannibalism, i.e., feather-plucking."
Dr. Butler was of a similar opinion regarding the utility of Millet. " In consequence of the small amount of nourishment it contains," he says, "1 never give Millet to British Birds."
There would seem, however, to be some little error concerning the alleged lack of nutriment in Millet. It is one of the cereal grasses, which, as a class, are fairly nutritive foodstuffs, and the above analysis shows the seed to contain 15 per cent, of Proteins. This is by no means a negligible quantity, for it amounts to something like sixty-eight grains to the ounce, and that is more than Canary seed itself contains, and also, more than is contained in Buckwheat, or Rye. or Maize, or even in our own cultivated Barley or Wheat.
The explanation probably lies in the fact that the amount of nutriment contained in any foodstuff is not a correct index as to the nourishing effect of that food on the living body: it is. of course, only the nutriment which is assimilated that really counts, and it may well be that it is mainly owing to the somewhat unbalanced character of the food elements in Millet, and not to any particular lack of proteins, that its nourishing powers appear to be small. Used in a proper manner it is undoubtedly a valuable food, and it would be well to .consider the pros, and cons, of the case very fairly before ceasing to use it altogether.

MISTLETOE

A few notes concerning this valuable fruit have already been given under Holly, to which reference may be made.


Mistletoe *(Viscum album)*

MOUNTAIN ASH

Mountain Ash berries are medicine and colour- food and are usually ready for
gathering just in time for the molting Bullfinch. There is probably nothing better and
more wholesome than these abundant fruits of the Rowan. They bring out depth of
breast-colour in quite a remarkable way. and build up the health at the same time.
Hawfinches, too. delight in " Rowans." and show great improvement after a short
course of this diet.
In their wild state, however, the birds of the Thrush tribe are the great devourers of
Rowan berries. The tree grows plentifully right across Europe, and the fruits have
been largely used by continental bird-catchers for baiting their traps. Indeed, it is
probably for this reason that the Mountain Ash is still often called the " Fowler's
Sendee " tree. Mountain Ash is a very misleading name, for the tree is not by any means confined to mountainous regions, and is in no way related to the Ash. You may find the tree almost anywhere, from the streets and avenues of the city, to the great woods of the country-side, or again two or three thousand feet up on the Scottish mountains.
As ordinarily grown, it may be a tree of ally height from ten up to forty feet, with a wealth of handsome leaves of the kind known botanically as compound— that is, each leaf is composed of a number of leaflets, like those of the common rose trees of our gardens. It is in this feature only that the Mountain Ash resembles the true Ash tree, which also bears compound leaves of a somewhat similar shape.
The flowers of the Mountain Ash appear in May and June, and grow in large clusters about five inches across. The individual flowers, as in the case of the elder, are quite small, but the large, creamy-white masses are a conspicuous sight when the trees are at their best. The structure of the separate flowers is very similar to that of the common wild rose, to which, indeed, the Rowan is nearly related. There are five small petals, with a mass of stamens in the center.
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The fruits of the Mountain Ash, although often called berries, are very much like tiny apples, and are not, botanically speaking, berries at all. but pomes. Each one, however, is quite globular, and is of a beautiful bright scarlet when ripe, with a clear yellow flesh. They hang in dense clusters, as will be seen from the sprig of the tree portrayed in the illustration.

MOUSE-EAR (See CHICKWEED, Mouse-ear, and Hawkweed, Mouse-ear).

MUSTARD


Mustard *(Sinapis alba)*

See also CHARLOCK, RAPE, etc.
Mustard is a popular name for several plants of the genus Brassica, which also includes the Charlock, the Turnip and the Rapes, and the seeds of all these are of a
very similar character.
The White Mustard (Brassica alba) is one of the commonest sorts. It is the plant which is grown as a spring salad-ingredient, and forms a large part of the ever popular "mustard-and-cress " of the shops. Farmers, too. often cultivate this plant for
use as a green-food for their livestock, and in many districts, it escapes from cultivation and becomes as troublesome a pest as the Charlock itself.
Then there is the Black Mustard (Brassica nigra) which is rather scarce in the wild
state, but often cultivated, for its seeds \when ground provide the familiar yellow condiment of our breakfast-tables.
Even the Charlock itself is really a Mustard (Brassica sinapis), and the following remarks concerning, from a little work on bird-foods now out of print, may be taken as applying to this group of plants in general: " Charlock." says G. E. Weston. " is one of the most common and easily obtainable of the cruciform family of plants, the members of which figure so largely' in the food-bill of our birds in the fields. It is essentially a good seed lor Linnets, Redpolls. Twites and Greenfinches, though doubtless Chaffinches and other Finches, and some of the Buntings, too. also devour it in a wild state.
After the com is cut. large flocks of the first mentioned species frequent the stubbles, and the seed they find most common there is that of Charlock and its near relatives, of which they unquestionably consume enormous quantities, to the benefit of the farmer, who detests these weeds as harmful to his crops. With fresh-caught birds a few pods of Charlock are especially good. It is to be bought in most seed shops, and is often found as an adulterant of sweet (or German summer) Rape seed, being a small, dark, reddish seed, very like the latter in appearance. It has a hot taste when chewed."
Mustard seeds are rich in proteins and fats, and are very heating and stimulating. They are, therefore, of great value in maintaining bodily heat during the colder months of the year. Great care must always be exercised, however, not to use them to excess, especially during the warm weather of summer. For further details see Charlock, Rape, etc., in other parts of this book.

NIGER

Also called Inga, Niga, and Nigra (now called Nyjer)


Safflower (Carthamus tinctorius)

Niger seed is the product of a Safflower plant and is cultivated largely in northern India, mainly for the production of a kind of lamp-oil, of which the seed contains a considerable amount. As a food for cage birds, it has given rise to an immense amount of controversy, which even now is by no means settled. Our present purpose is not to add one more opinion as to the merits or demerits of this seed, but rather to say a little of the various pros and cons, and leave readers themselves open to form their own opinions after a fair and reasonable trial.

The seeds: of Niger yield according to G. H. Boaler. from 35 per cent, to 40 per cent, of a brownish oil. which becomes pale yellow after refining. " The oil." says this same writer, " emits a slight aromatic odor, somewhat resembling thyme. The cold-pressure oil is used for food, and that obtained by warm pressure is used in the manufacture of soap. The better the seed the shinier black it is the appearance of the husk; the flesh of the kernel is similar in appearance to Hemp, and its qualities arc probably of much the same character.

The opinion generally expressed is that Niger is good for hen Canaries during the breeding, season, that it is stimulating and invigorating, but that its effect upon Goldfinches and Linnets is questioned, some denouncing it as a poison for Finches, and others recommending its use for those birds."

Dr. Gordon Stables says: " Why this seed should be given to birds is a mystery to me. for in most cases the habitual use of it is Positively harmful, and with Canaries will rot away the liver in a very short space of time. It is, however, eaten with avidity by most birds, for, like boys and men, too, they will throw out good wholesome food tor the sake of a dainty which tickles the palate for a time and then ends by ruining their digestive organs."

That is a rather severe indictment of Niger from a medical man, and it is interesting to contrast it with the conclusions of a breeder of C. A. House's experience. In his very practical little Canary Manual, this well-known authority says of Niger seed: "It is sold under various titles, but by whatever name it is called, whether Inga, Nigra, or Nigra, it is one and the same seed, and a grand one, too. I have used during the winter and spring months immense quantities. Some fanciers use it only during the breeding season; I use it all the year round. Others only feed their hens on it; I let my cocks have it as well. I have had most beneficial results from its use at all times, and all seasons; also with old birds, both cocks and hens, and the youngsters as well. Birds will leave any other seed for this, even Hemp. Although it is so rich in oil, 1 have never come across any ill effects from its use, and for keeping birds in good health and full song there is no seed to equal it. "

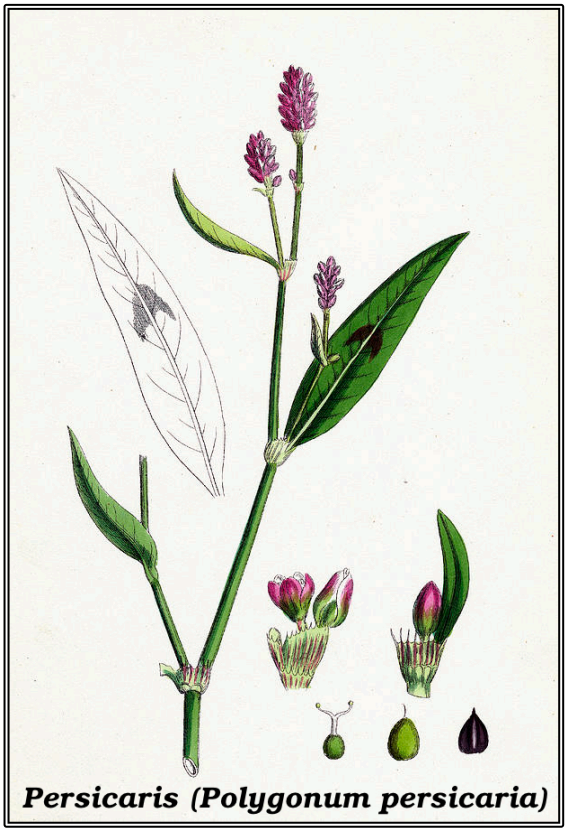
In a book that was published some time ago, entitled .Notes on Cage Birds, edited by Dr. W. T. Greene. M.A..F.Z.S., the following paragraph regarding Niger occurred:
I have had some experience of this seed, having fed both British seed-eating birds and Canaries on if for some months. My experience of it is that it maintains the birds in perfect health, enriches their plumage, and in several cases has restored the song to birds who have lost it through disease. In every case, it is most valuable to breeders, as the risk of losing birds is reduced to a minimum, its effect upon them being of such a salutary nature. I have not the slightest hesitation in expressing my opinion that it is good."
With regard to the alleged injurious effects of Niger, it is very probable, as G. H. Boaler has pointed out. that "everything depends upon the condition and quality of the seed, and it appears abundantly clear that the mischievous results sometimes reported ought to be attributed rather to the inferior quality and bad. dirty condition of the seeds used, then to their natural properties.
It must be borne in mind that the shape of the seed renders it peculiarly liable to damage in the bulk . A long, thin seed is much more easily crushed or broken than a round seed, such as Rape, for instance, and. when the outer shell is broken, the natural protection of the contents is destroyed, so that the oil speedily becomes rancid. This rancid oil. together with the dust which develops extensively in a sample of Niger, is undoubtedly a source of injury to cage birds, and the warning is particularly necessary in this case to see that the seeds which are given to the birds are thoroughly clean, shiny black in colour, and free from damaged or broken seeds."
The opinion of E. P. S. Elfick may also be of interest Niger, he says, to be good. " should be bright, of an intensely black colour, emitting a peculiar odor, not musty, free from dust and dirt.... Some users extol its virtues to the skies ; other condemn it utterly. It should at all times be used sparingly, and given in small quantities. It is very' stimulating, I venture to say, more so than any other seed-food known. A little to a bird when soft or out of condition acts as does eau de vie to ourselves." The analysis of Niger seed has been given as : Water, 8.4 per cent., Albuminoids or Proteins, 17.5 per cent., Fats and Oils, 32.7 per cent, Starches and other Carbohydrates, 15.3 per cent, Ash or Mineral matter, 7.0 per cent.
Summarizing the various opinions expressed concerning the use of this seed in the cage or avian', one may say that from analysis it certainly appears to be an unbalanced food, containing far too much fatty matter in proportion to its Carbohydrates. Also, there is no doubt that when the seed-coats are broken, and the contained oils thus exposed to the action of the air, a chemical change takes place in these which quickly results in their becoming rancid. And, thirdly, it is equally certain that in some cases, at least, Niger has done a good deal of harm to birds which have been fed upon it.
The difference of opinion regarding the action of Niger seed is therefore probably best explained by supposing that the folk who use it differ in character and temperament. It is here undoubtedly that the fastidious person gains. If he makes absolutely certain that his seed is in fresh and good condition, that it is not given to excess, and that it is always combined with a variety of other foods which supply the elements lacking in this one, and so establish a balance in the aliment given, there would seem to be no reason for excluding this very' favorite food from the aviary. It is never safe to conclude that, because certain folks get bad results from the use of a certain foodstuff, therefore the foodstuff itself is injurious. It all depends upon the knowledge and care which are exercised in its use.

NIPPLEWORT


Nipplewort *(Lapsana communis)*

Nipplewort is a very common plant in waste places and by roadsides, where it may be found in flower during June and July. In olden days it was highly extolled as a medical plant, and as most of our wild birds are very fond of its seed, which is produced in considerable quantities, it is one which can with advantage form part of a mixture of wild seeds for British birds. The stems of Nipplewort are usually about three feet in height, and much branched. The leaves van from egg-shaped to lyre-shaped, and are usually more or less toothed. The flower-heads are similar to very small Dandelions, and seldom measure more than about a quarter of an inch in diameter. They are produced in great abundance, but usually close up in the afternoons.

PERSICARIA

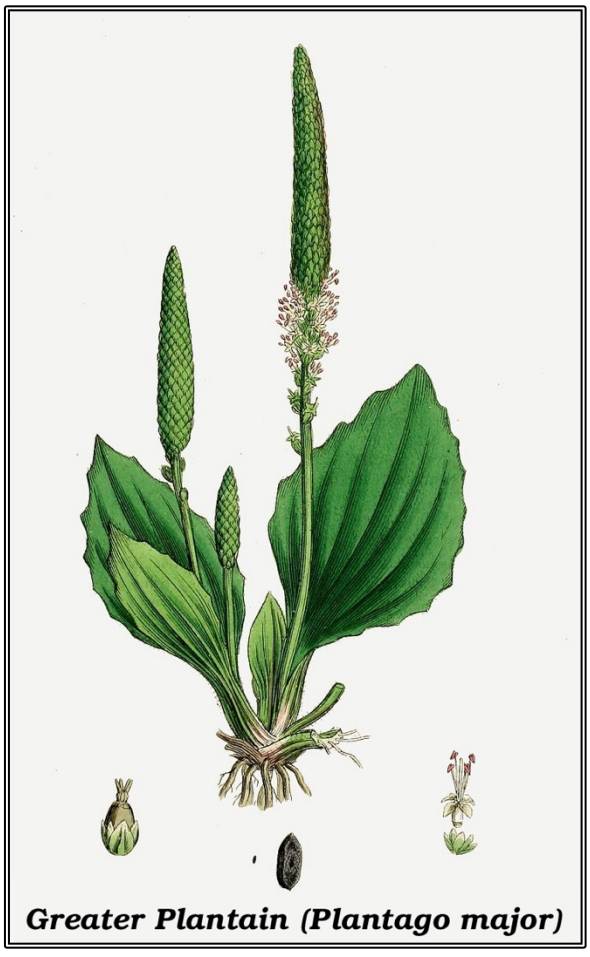

Persicaris (Polygonum persicaria)

Persicaria is a plant that is often overlooked and very little known, although it is really quiet an elegant weed when in full flower. It is a very common plant, however, in practically even part of the country, and may be found in moist gardens and waste places right across Britain to the Shetland Isles.
I do not think that the seeds of Persicaria have ever been properly analyzed, but practically all our native Finches devour them eagerly in their wild state, not only when the seeds are ripe and hard, but also in their soft, half-ripened stages.
Under the name of Redshank, Persicaria has been widely used by aviarists for a large number of years, and is greatly enjoyed by most British hardbills. Its medicinal properties appear to be little known, but its good effects when used during the molt

have often been spoken highly of: and the seeds, if properly dried, will keep in excellent condition for a very long time.
Persicaria is an annual plant, and its stems reach a height of from about twelve to eighteen inches. They are sometimes of erect habit, but often lie partly prostrate upon the ground. They are always more or less branched, as shown in the illustration, and are usually conspicuously swollen at the joints.
The leaves are practically stalkless, rather narrow-oval in shape, with longish tapering points, and there is often (though not always) a large black blotch plainly visible upon the upper surface.
The flowers, as will be seen from the drawing, grow in dense spike-like heads at the summits of the stalks. These heads vary in length from about half an inch in the smallest up to nearly two inches in the largest plants, and each one sometimes has a small green leaf at the base.
The individual flowers are very tiny, and have no true petals, but the bright red-pink (sometimes white) sepals make the Persicaria a really handsome weed when in full blossom.
Persicaria is nearly related to the Docks, and its seeds are somewhat similar in character. It is still more nearly, however, related to the plant known as Knotgrass, and even a casual comparison of the two plants will render this relationship at once obvious. It is in flower from June to October.

PLANTAIN, Greater

Greater Plantain is one of the five common species of Plantains which grow wild in this country, and is one: of the most widely distributed and best known of all. It grows practically everywhere, but delights especially in waysides, waste places, and pastures. Other popular names for this species arc Rats'-tails and Waybread.
The great point to bear in mind about Plantains is that this species, and also the Ribwort (which is a very near relative), arc not only highly nourishing foods, but valuable medicines too. having marked beneficial effects upon the breathing, organs
in cases of asthma and kindred disorders. They are also amongst the best of our wild foods for ensuring a thoroughly healthy plumage after molting.
The question is often asked as to which of these two Plantains is the better food for one to gather for his bird. So far as food-value and medicinal virtues are concerned.



Greater Plantain (Plantago major)

I believe there is practically no difference, but there is a marked difference in the size of the seed, that of the Ribwort species being very' much larger.
For this reason, 1 would say that where there is an abundant supply of both sorts, as is usually the case in country' districts, it is better to gather the Ribwort for use as a dried seed for storing purposes, and the Greater for use as a green-food for immediate use.
There are few birds which will not delight in a feed of half-ripe " Rats'-tails," and although their nutritive content is slightly below that of well-harvested seeds, they hold vital natural elements which cannot but have an excellent effect upon the birds' well-being.
The Greater Plantain is a weed that is easily identified. Its leaves, as shown in the drawing, are large oval structures, with coarse and irregular teeth along their edges, and from three to seven prominent ribs in the blade.
The flower-stalk itself is comparatively short, but that part of it which bears the seeds is always a great deal longer, and may often be fully a foot or more from bottom to top. In this character you can distinguish it at once from the Ribwort, which has very long, bare stalks, surmounted by more or less stumpy heads.
The flowers of this Plantain are small, green, an inconspicuous, but when the purple anthers are out (as in the illustration), which usually happens from May to September, they often make showy masses of colour along the waysides. The seeds are small, black, and rather rough, and are flat in front.

PLANTAIN, Ribwort

Ribwort Plantain has always been a favorite seed with breeders of Linnets, and is claimed by many to be the best of all wild foods to cam' these birds safely through the molt. Its effect is often most striking, especially when perfectly fresh seed only is used. But not Linnets alone are fond of this common weed. Greenfinches also show a particular delight in it. and. in fact almost all seed-eaters welcome it as a change from other fare.
This plantain has long been claimed to have medicinal virtues of a high order, and was much used by the old herbalist's in their treatment of human disorders.
In bird-dom its good effects are shown principally upon the plumage and the lungs. A course of Plantain and Rape seed is a favorite remedy for difficult breathing, wheeziness and asthmatic tendencies in British birds, and many cases are on record of remarkable cures by this means alone.


Ribwort Plantain *(Plantago lancelata)*

Ribwort Plantain is quite a different plant from the Greater Plantain, or rattails (see above).
We have five fairly common sorts of Plantain in this country, but Ribwort is the one which provides the Plantain seed of commerce.
The reason for this is probably to be found in the size of its seeds, which are many times larger than those of its near relatives. When ripe, they arc brown and glossy, long-oval in shape, and have a deep channel on one side.
They usually measure about one-eighth of an inch in length, whereas those of the rats'-tails are never more than half that length, and are very much less in girth. Hence it is much easier to gather quantities of Ribwort: seeds than it is those of the other species.
The Ribwort Plantain is very distinctive in appearance, though very variable in habit. The leaves are long and narrow, their length may be even twelve times as great as their breadth. In this way you may distinguish it at once from the Greater Plantain, whose leaves are very broad and roundish.
The (lowering stems are usually about a foot or so in height, and each one is surmounted by the blackish heads shown in the illustration. The lower head is just in flower and so shows the numerous white stamens standing out at the sides. The upper head has reached the seeding stage. The flowering period lasts from April to October.

POPPY, Corn

Poppy is a weed whose seed could scarcely be praised too highly, and is a great favorite with most Canaries and British birds. It is not only a wholesome and highly nourishing food, but is of considerable use also as a medicine, for it contains a goodly percentage of valuable oil, which has a most beneficial effect upon the birds' food-passages.
Poppy seed is closely allied to Mawseed (which is really the seed of a foreign Poppy), and has, I believe, all the good qualities for which Mawseed is famous.
It is devoured with very obvious relish by the youngest and oldest of birds, and is often practically the only seed an indisposed or aged Canary will take with any eagerness.
In any kind of bowel disorder, Poppy seed is of greatest assistance.
It does not appear to have any drastic action at all, but in cases of either unnatural looseness or constipation, it quickly restores a normal action of the intestines.
There are very few bird foods of which one can speak so highly in this respect.

Poppy *(Papaver rhoeas)*

In Britain we have numerous sorts of Poppies, both wild and cultivated, and often the latter escape into the fields and appear to be true natives.
I have never heard that the properties of the seeds of the various species have been properly studied, and I do not think that analyses have been made of most of them, so that it does not seem safe quite to suppose that the seeds of all our Poppies would have the same effect upon the functions of birds.
The commonest and best-known British Poppy is the one known as Corn Poppy, or Corn Rose.
Whatever doubtful things may be said about the usefulness of other species, this one. at any rate, is perfectly safe, and quite above suspicion.
The plant usually grows to a height of about a foot or eighteen inches, and the handsome deep scarlet Powers measure about three or four inches across.
Each one is made up of four petals, and has the familiar green capsule and numerous stamens in the center.
An important character to observe is the outstanding hairs along the stalks.
In most of the other Poppies these hairs lie flat, but in the true Com Poppy they stand out conspicuously at right angles to the stems.

PRIVET

Privet is a common hedge shrub all over the country, and might be used by birdkeepers a great deal more than it is. No detailed analysis of its well-known berries
appears to have been made, but the bush is very nearly related to the famous olive of
southern Europe, and there is no doubt whatever about its fruit having a most beneficial effect upon the birds which include it in their diet.
Privet berries seem to have won their greatest fame as a food for the Bullfinch, and it
is very doubtful if there is any other coloring agent that works so safely and surely as
these. The plumage of the breast develops a deeper and richer tone, and the blacks
and grays are immensely improved in pigment, and in polish, particularly in the caseof cage-moulted birds.

Privet *(Papaver rhoeas)*

Not only Bullfinches, however, but Greenfinches, Chaffinches. Hawfinches, as well as Thrushes, robins and Blackcaps all delight in these ripe juicy berries, and most of them show a marked improvement both in health and appearance after a course of

such diet.
There are several other hedgerow shrubs which bear black berries showing some sort of resemblance to those of the Privet, but the following brief description should enable anyone to identify the true plant.
In size it may reach a height of anything up to about ten feet. The branches are slender and free from hairs, and the bark is quite smooth.
The leaves are roughly oval in shape, and grow in opposite pairs along the branches, as will be seen from the illustration. It is important to notice that the edges of the leaves are quite free from lobes or notches of any kind, that they terminate in sharp points, and that their stalks are very short. In texture they are somewhat tough and leathery, and are, in fact, almost evergreen, often staying upon the twigs throughout most of the winter, though they usually lose their deep green colour, and assume various shades of browns and purples.
The flowers grow in dense clusters called panicles, and remind one at once of those of the favorite lilac of our gardens, to which the Privet is nearly related. These panicles, however, in the case of the Privet, are rarely more than three inches in length, and usually less, and the individual flowers are only about one sixth of an inch in diameter. They generally appear during June and July, and the berries may be found from about October right on through most of the winter.

QUEEN-OF-THE-MEADOWS (See MEADOWSWEET).

RADISH

The seeds of both the cultivated and the wild Radish are sometimes used as a food for cage birds. They are said to have a cooling effect, and to be useful for getting Linnets into condition. British birds are very fond of this seed when it is beginning to sprout in the ground, but in its dry state it is rather hard for a bird food, and is not recommended for Canaries.

RAGWORT


Ragwort *(Senecio jacobaea)*

Ragwort is a plant which breeders of Goldfinches usually know well, for it belongs to the great family of composite flowers, for which the Goldfinch almost always seems to show such a marked preference.
In its wild state it is a favorite food of the Greenfinch, too. and during the autumn months large flocks of these birds may often be seen raiding the vast colonies of this plant which establish themselves in our pastures and waste ground.
Also, the Jay and other insect eaters know the Ragwort quite well, for it is the favorite food plant of the caterpillars of the cinnabar moth, and is often thickly infested with myriads of these tempting morsels.
The Ragwort is a kind of sturdy relation of the well-known groundsel, but it is a very much larger and coarser plant in every way. For this reason, probably, it is never taken as a green-food, though there may be another reason, too. for the leaves of Ragwort are known to be poisonous to live stock, and may even cause the death of large animals if eaten in any quantity, even when the plant is dried and mixed with hay.
Bird keepers, however, need have no fear about the seeds, for they are the natural food of hordes of our native birds, and have long been an important ingredient in seed mixtures for British birds.
The stems of Ragwort grow to a height of three or four feet, and are erect, stout and leafy. They are usually almost free from hairs, though occasionally they may be found more or less covered with a sort of cottony growth.
The leaves, as will be seen from the illustration, are deeply cut and notched, and the lower ones are cut into a number of narrow segments. They also have fairly long stalks, while the upper leaves have none, but even partly wrap the stem with their bases.
The flower-heads grow in dense masses called corymbs, and each head measures about an inch or so in diameter. Unlike its relative, the Groundsel, this plant has a ring of large showy ray-flowers round about the smaller ones which make up the. disk, and it is these, of course, which give the Ragwort its bright and attractive appearance.

RAPE

The plant known to botanists as Brassica napus is a truly wild species of Cabbage, but the seeds which are marketed as Rape are obtained from cultivated varieties of this plant, which are extensively grown in this country, and on the Continent, as fodder-plants, and for the sake of the oil contained in their seeds.

The English Rape is often called Brassica napus. and bears seed which is larger than that of the German, or Summer. Rape, and more uniformly black in colour. In taste it is rather more bitter, but when properly scalded is said to be an excellent corrective food, more especially for British birds. If used at all. however, it should be only in small quantities.

The best variety of Rape for general use is undoubtedly the German Rape, a good sample of which, according to G. H. Boaler. will be sweet to the taste, and in bestcondition when it is from nine to eighteen months old: if quite new it is said to
produce unpleasant results.

All the seeds of the genus Brassica need very careful cleaning and storage, for they soon become not only musty in odor, but terribly infested with weevils and other pests, which eat into the seeds and expose their contents to the air. This, as already mentioned in the case of Niger, often leads to a decomposition of the oily matter, and a total loss of sweetness and wholesomeness.

Otto Brander wrote of this seed: "Summer (or German) Rape only should be used. Winter Rape is bitter, acrid and injurious. Genuine Summer Rape should be free from other seeds, when fully ripened of a reddish, purple-brown colour, small and even in size, free from skeleton husks of weevil-eaten seeds, of a pleasant savor, and rich in oil. The best signs of fully ripened seed when in use are the loose husks found in the seed-boxes; good seed, when soaked in boiling water, should have a scent as of spice, and be full of grain."

"Rape, in my opinion," wrote E. P. S. Elfick, "is one of the best seeds for Canaries, and the majority of birds belonging to the Finch tribe, It should be of a mild taste. and nutty in flavor, pleasant to the palate, clean and sweet, in colour a reddish purple."

The analysis of Rape seed is given as: Water, 11.5 per cent.; Albuminoids or Proteins, 19.4 per cent.; Fats and Oils, 40.5 per cent.; Starches and other Carbohydrates, 10.2 per cent.; Ash and Mineral matter, 3.9 per cent. The mineral matter is particularly rich in magnesia, potash, lime and phosphoric acid, the last item forming nearly 50 per cent., whilst the potash approaches 25 per cent, of the

whole.
If only the best sorts of Rape are used, and the seed is always in excellent condition when given, it is a food of great value for most seed-eating birds, but it is always well to use a powerful seed of this kind in strictest moderation. It is much richer than Canary seed, and when a mixture of these seeds is used, the latter should always preponderate. "If a temperate hand is not used in connection with Rape seed." says C. A. Mouse, in his very practical Canary Manual, " you will be often plagued with that scourge of the bird-room, diarrhea, owing to the fact that it possesses strong acid and purgative properties. Never use any other than the best Red, or Summer, German Rape."

RAT'S-TAIL (See PLANTAIN, Great).

REDSHANK (See PERSICARIA).

RIBWORT (See PLANTAIN, Ribwort),

ROSE (See Hips).

ROWAN (See MOUNTAIN ASH).

RYE GRASS (See GRASS, Rye).

SESAME

Sesame (Sesamum Indicum)

Sesame seed has never been very widely used in this country as a bird food, but Canaries and most of our Finches will eat it readily. It contains a high percentage of fats and oils, and must therefore be used with caution. It is very valuable as a chance of food, and especially so during the colder months of the year. Sesame is a small, flat, yellowish seed, reminding one of flattened yellow Millet. The plant grows only in tropical countries, and is much used in Egypt for the production of an almost tasteless fixed oil. It is allied to the brilliant Bignonias of our hothouses.

SHEPHERD'S PURSE

Shepherd's Purse *(Capsella bursapastoris)*

Shepherd's Purse is worth knowing well. There are several weeds which closely resemble it, but not one that is quite so good. It has the advantage, too, that you can use it with perfect safety in all stages of its growth, and as it is a common weed everywhere, there need be no month in the twelve when you are without it.

Even with very young birds it is always safe; is a medicine as well as a food, and, unlike many other medicines, is thoroughly enjoyed.

The best stage at which to gather this plant is when the little seed-pods are fully formed, though if you want it only for immediate use. it does not matter about the pods being ripe.

In their green stage they are probably not quite so nutritious, but have a most beneficial: effect upon the health of the birds, and you may give them to British, to foreign, or to Canaries, with equally good results.

The stems of Shepherd's Purse grow to a height of from 6 to 18 inches, but are

usually about 1 foot, and are more or less rough or slightly hair}'.
Sometimes there is only a single stem, but more commonly it has several branches, each one ending in flowers and seed-pods.
The lower leaves are numerous, and usually form a conspicuous rosette at the base of the stem.
These lower leaves are nearly always deeply cut into quite narrow lobes. and so differ very much from the simple pointed leaves which wrap their bases about the upper parts of the stems.
The flowers are about one-tenth of an inch in diameter, and are made up of four tiny white petals arranged in the form of a cross.
These are (luckily followed by comparatively large triangular or heart-shaped seedpods, which are really the " shepherd's purses " referred to in the name.
When quite ripe, each half splits away from the stalk, and liberates the small yellowish-brown seeds.
If it is not gathered before this stage is reached, great care will be needed to prevent loss.
Shepherd's Purse is abundant in gardens and fields all over the country, and may be found in flower from January to December.

SLOE (see BLACKTHORN).

SNOWBERRY

Snowberry is not really an English shrub, though it has been cultivated in this country for more than a century, and has so thoroughly established itself that it is now to be found quite commonly in many of our woodlands and shady waste places.
The fruits of the Snowberry do not appear to have been put to any use in industry, and 1 do not think they have ever been properly analyzed. They are. however, decidedly ornamental, and are practically the only berries in this country which are white when ripe.
We have, it is true, so-called "white" currants, raspberries and other fruits, but the
Snowberry has been far more appropriately named, for its ripe berries have the whiteness of snow, and are so large and conspicuous (see illustration) that they catch the attention at once.
Although not a native shrub, a great number of our birds have discovered that the Snowberry 's fruits are highly delectable and, in the aviary, they are particularly

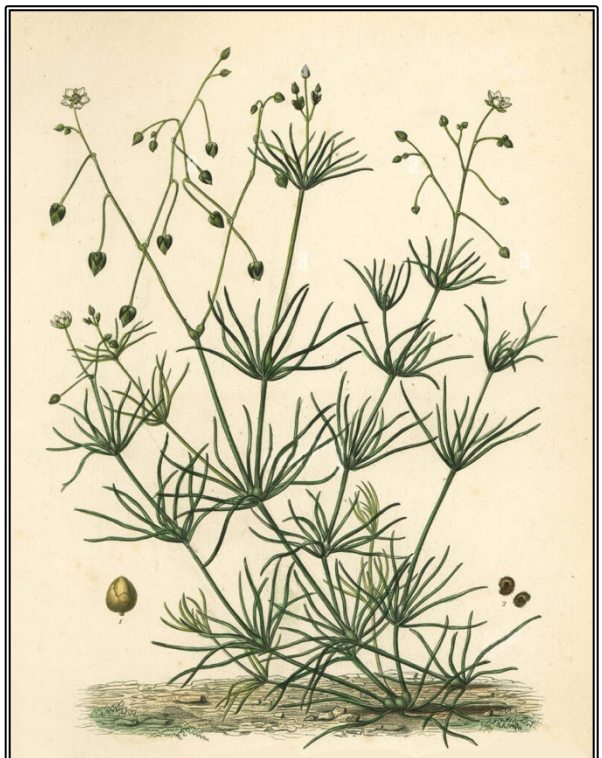
Snowberry *(Symphoricarpos racempsus)*

enjoyed by Nightingales, Blackcaps and other Warblers. They are. of course, of no value as a colour-food, but probably contain medicinal virtues similar to those of the honeysuckle, to which plant the present species is nearly related.
The Snowberry, as usually found, is a low-growing bush, with long and rather slender branches. In the early months of the year a number of new shoots usually spring up from the base, and are conspicuous in their clothing of fresh green leaves. The normal leaves are roundish-oval in shape, and grow in opposite pairs, as will be seen from the illustration. The young shoots just referred to. however, often bear longer leaves with fairly deep indentations round the edges.
The rose-colored flowers appear in early summer, and are strikingly different in appearance from those of the honeysuckle. They are very much smaller than the berries themselves, and are sufficiently inconspicuous to be usually overlooked.
The large pure white berries (see illustration) grow in dense clusters at the ends of the twigs, and may be found on the shrubs throughout most of the autumn and early winter.
So far as human beings are concerned, it must be remembered that Snowberry (sometimes called St. Peter's Wort) is really a poisonous plant, containing the substance known as loturidine. Its berries should, therefore, be kept well out of the reach of small children.

SOWTHISTLE (see THISTLE, Sow).

SPURREY

Corn Spurrey is a weed of rather local distribution, but where it does occur there is often such an abundance of it that it becomes one of the worst pests of the farmer, and in such districts, one may gather it in profitable quantities with a minimum of effort.
In some countries Corn Spurrey is called Mouse-weed, and is widely used for Canaries and British Finches, especially during the molting season, when it seems to be taken with greater eagerness than at any other time.
One peculiar thing about Com Spurrey is that it loves a sandy soil. On heavy ground it soon dies out.
But in some of the sandy fields of Bedfordshire it is often almost the only weed to be seen, and one can gather an ounce or more of its seeds in a quarter of



Spurrey (Spergula arvensis)

an hour or so quite easily on a country' walk.
In general appearance. Corn Spurrey reminds one of the common Chickweed. And still more of the Mouse-ear species, to both of which plants it is closely related.
Its flowers are small and white, and have five tiny petals without any notch in them. They often remain closed tightly in dull weather, and so are very little seen or known.
It is when the plants begin to form their seed-pods that they become conspicuous, for each flower-stalk then turns downwards with an angular bend, making an almost knee-like joint at the main stem.
In its leaves, too, the Corn Spurrey is very different from most of our other wild plants.
Strictly speaking, they grow in opposite pairs, but a number of dwarf shoots arise at the same point in the stem, and assume the character of the narrow leaves. Hence .the plant appears as if it had rings of six or more leaves at every joint.
Corn Spurrey reaches a height of from six to twelve inches, and resembles Groundsel in being sometimes smooth and sometimes hairy. Occasionally, it is slightly sticky, and has a number of minute insects adhering to its stems.
The seed-heads are unusually abundant, and hold vast numbers of small black seeds. They must be watched closely in sunny weather, for the pods readily burst if left too long on the plants, scattering their seeds far and wide, and so render the harvest barely worth the gathering .

SUNFLOWER

Sunflower is used principally as a food for birds of the Parrot tribe. It is very rich in oil, and when crushed might be more widely used for Canaries and other small birds during the colder months of the year.


Sunflower *(Helianthus annuus)*

TEAZLE, Wild


Wild Teazle *(Dipsacus sylvestris)*

Teazle seed is well-nigh indispensable to keepers of British birds, and it is doubtful if the Goldfinch can ever be brought to his finest possible condition without it. It has sometimes been considered to be a medicine rather than a food, though this is really a mistake, for Teazle, in addition to being a fine natural tonic, is highly nourishing, too, and contains quite a good proportion of assimilable nitrogenous matter.

It is an excellent plan to keep a supply of Teazle seed always at hand, for there are times when nothing else seems to have just that happy power of overcoming the harmful effects of too exclusive a use of such fattening foods as Hemp and Linseed.

The Teazle seeds of commerce are not quite the same as those one gathers in the fields, for the shop-seeds always obtained from the Fuller's Teazle, which is a cultivated, and not a wild plant. Provided the seeds are fresh, however, and are in good condition, there is no difference in their value as a food stuff.

It is a great mistake to suppose that stale seeds are equal to fresh ones, even if they have been kept in a thoroughly dry and healthy condition. When seeds are stored for a long time, they undergo chemical and other changes, and many of their subtle medicinal virtues are wholly lost. This is wherein lies one of the very great advantages of gathering one's own seeds fresh from the open countryside.

The wild Teazle is a tall, erect plant, with stems which sometimes reach a height of five feet or more. It is free from hairs, but has very prickly ribs, and is well branched, and stout.

The leaves are from six to ten inches in length, and not only grow in opposite pairs, but often have their bases joined together, so that a cup is formed round about the stem, and is often to be found full of rainwater and drowned insects.

The flowers grow in large, almost egg-shaped heads, as shown in the illustration, and bear a number of rigid, are spiny bracts. The individual blossoms are quite small, and open about the middle of the head first, extending gradually upwards and downwards until the whole number has expanded. They are tubular in shape, and purplish in colour, and may be found during August and September.

THISTLE, Scotch

Scotch Thistle *(Cirsium vulgare)*

The Scotch Thistle, or Cotton Thistle, as it is sometimes called, although chosen as the national emblem of Scotland, is really not a native of that country, and is found there only in cultivation, or as an escape. In England it is occasionally found growing in dry waste places, but it is never very common in the wild state.
The tall, stout stems may reach a height of five feet or more, and the leaves are very large and spiny. The flower-heads are pale purple, and often reach two inches in diameter. They may be found from July to September. The seeds are large and very numerous, and are greatly appreciated by most seed-eating birds, particularly Siskins and Goldfinches. "Heads containing maggots," says G. E. Weston, "should never be overlooked, personally, I consider them, during the molt, the most valuable of all."

THISTLE, Sow

Milk Thistle *(Silybum marianum)*

The common Sow Thistle, or Milk Thistle, has long been a favorite plant with birdkeepers, though it should not be confused with the true Milk Thistle (Carduus marianus) which is a totally different plant, and a very rare one.
Sow Thistle grows abundantly in gardens, allotments, and fields all over the country, and is in bloom from June to September. Its stems are usually much branched, and grow to a height of about three feet. They are round and glossy, and quite free from prickles. The leaves are large and softly prickly, and in this latter respect differ widely from those of the true Thistles, as they can usually be handled without any injury to the skin.

The flower-heads measure about one inch in diameter, and resemble pale yellow Dandelions. The fruiting heads are feathery, and contain an abundance of useful seeds. " Sow Thistle," writes G. E. Weston. " has a particular value of its own. inasmuch as it is commonly to be found simply smothered with blight (or green-flies), and over a supply of it in this condition, one's birds simply go mad with delight."

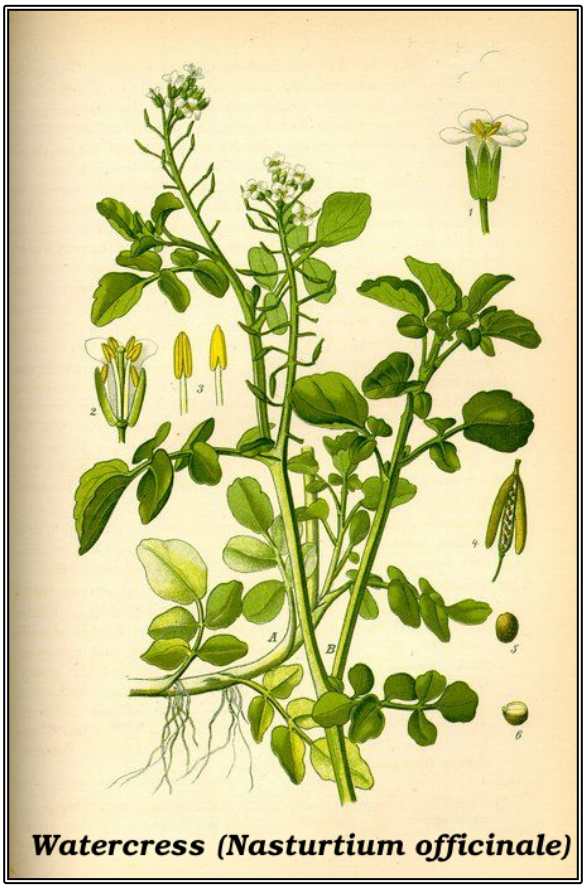
THISTLE, Spear

Spear Thistle (Cnicus lanceolatus)

Spear Thistle is often said to be the most valuable plant to the bird-keeper in all its tribe, though there are several others which, to say the least, run it pretty closely in this claim. Perhaps one of the strongest points in its favor is its wide distribution and
abundant growth, for you ma\ find it in plenty in almost every patch of waste around from Land's End to Joh o' Groats. the thistles. as a group, bear an abundance of large and nutritious seeds, and I have never heard of any one of them ever causing the slightest harm when used in the aviary. They all contain varying amounts of valuable medicinal salts, and have long been famed for their marked beneficial effect upon the blood-stream. Their tonic action is one of their greatest assets.
In many rural districts the Spear Thistle is thought to be the true Scottish Thistle, and is often called by that name, but it is really a very different plant, though perhaps little less valuable as a bird-food.
The flower-heads of the present species (in common with several of the others) are very commonly infested with numbers of small grubs, which sometimes devour practically all. the seed before it has fully ripened. It is a good plan, therefore, to gather at least some of the heads in their half-ripe state, and give them to the birds immediately, so that the soft, milky seeds and the tender young grubs may both be enjoyed together.
The stems of the Spear Thistle are erect and stout, and are thickly clothed with a spiny growth from base to summit, as shown in the upper part of the stem in the illustration. They are usually considerably branched, and bear the large and ornamental flower-heads at their extremities.
The leaves are very deeply cut into narrow, pointed segments, and practically the whole of them terminate in a powerful spear-like point after which the plant has been named. They vary from six to twelve inches in length, and are usually somewhat cottony on the undersides.
The flower-heads are about an inch in diameter (on rich soil they may be nearly two inches), and stand very erectly upon the plant. The florets are reddish purple, and

have a globular mass of spiny bracts beneath them. They may be found from late June right on to October, and the seeds are usually ready to gather from July onwards.

WATERCRESS


Watercress (Nasturtium officinale)

Watercress is probably the most highly medicinal of all our wild green-foods, but it should always be used with care', because it often thrives in water tainted with Sewage and other disease-producing matter. It should preferably be gathered from clear, sparkling brooks, away from the neighborhood of farms and houses.

If these conditions arc fulfilled there is no doubt about the excellent effect of the young tender shoots of Watercress on the purity of the blood-stream.

It contains just those vital elements which are so often lacking from dried or preserved foods, and often produces a tonic effect which is astonishing.

One other warning, however, should be given regarding this plant, and that is that it is often associated with definitely poisonous species of weeds.

The mere fact that one buys it at a high-class shop is no guarantee, however, that there are no poisonous weeds with it, for neither the gatherers nor the vendors are usually botanists.

In my own experience I have discovered all sorts of questionable plants mixed with the true Watercress, and very closely resembling it.

One of the best tests is that of taste. If you find a spray that is doubtful (and it is well to bear in mind that the Watercress is a most variable plant), it will be safer to taste a tiny portion before giving it to the birds.

There is no poisonous water-weed with a taste that is anything like that of the true Watercress.

Watercress stems may be from one to four feet in length, and are always deep green or brownish in colour, and free from hairs.

They often float on the water, and usually send out masses of white root-fibers at

The leaves are composed of from three to six pairs of opposite leaflets, with one terminal one, and these leaflets vary in shape from almost round to quite long and narrow.

The plants bearing leaflets of this latter shape are often called ash-lealed watercress, but they are nothing more than a slight variation of the true species, and not a different plant.

Watercress flowers appear in May, and grow in clustered form at the ends of the branches. Each flower has four small white petals arranged in the form of a cross. The seed-pods which follow are small and slender, and seldom more than half an inch in length. The small seeds are relished by most of the British birds.

WAYBREAD (See PLANTAIN, Great).

WINTERCRESS

Wintercress is a very common weed all over the country, but often escapes notice on account of its rather inconspicuous appearance. It has never been widely known as a cage bird food, but is well worthy of more attention being given to it. It is a close relation of the garden Cress and the Mustard, and produces an abundance of small seeds of a pungent and waning nature, which form an excellent addition to wild-seed mixtures that are lacking in stimulating properties.

Wintercress *(Barbarea vulgaris)*

Wintercress resembles Watercress in many ways, and some birds relish its tender shoots as a green-food.

The plant as a whole contains quite a high proportion of sulfur in a readily assimilable condition, and for that reason has been widely used and recommended as a rustic remedy for impure blood.

Wintercress, indeed, was formerly much used in its young state as a salad plant, and the American Cress of our gardens is only like a cultivated form of it.

Both plants are a valuable addition to the diet of practically all. British Birds.

The ordinary wild Wintercress is a plant which usually grows on moist waste ground, and especially by ponds and rivers and ditches.

Its stems are rigid and erect, and seldom very much branched; sometimes there is only just one single main stem. The average height is from eighteen inches to two feet.

The leaves are very variable in shape, but the lower ones are usually more or less cut up into segments, with the terminal segment largest of all.

The upper leaves are much smaller, and often without any segment at all. but their bases are wrapped round about the main stem after the manner of those of the Shepherd's Purse.

All the leaves have a conspicuously dark green appearance, which sets them out distinctly from most of the herbage surrounding them.

The flowers are arranged in fairly dense clusters, which may be several inches long, and are bright yellow in colour.
Each blossom is like a minute Mustard or Charlock flower, made up of four petals arranged in the form of a cross.
These are soon followed by the rounded narrow' pods, each about one inch in length, and the small seeds which these contain are about one and a half times longer than their breadth.

APPENDIX

THE PRINCIPLES OF DIET

Strictly speaking, the word food should include everything taken into the body which, either directly or indirectly, goes to the growth or repair of tissue, or to the production of functional activity of any kind. Air is therefore as truly a food as fruits and vegetables, though for practical purposes we usually confine ourselves to those substances which are taken, via the mouth, into the alimentary' canal.

But even if we accept the above as a definition, it is hardly wide enough, for there are many substances which do not themselves build tissue, or repair waste, or even directly produce energy or activity, yet which are absolutely essential to the continued well-being of the body, be it of man or bird. These substances should therefore, obviously be considered in any scheme which attempts to set out the principles of nutrition.

Nor must we overlook, of course, what might be called the negative side of the question, for there is another class of foodstuffs which contain certain elements not only useless to the living tissues, but positively harmful. Even a complete loss of voice for example, may result from an unwise course of diet.

Then again, however careful one may be over the selection of the foods themselves, there is always the question of the individual to consider if the best results would be obtained. The old saying about one man's meat being another's poison is equally true of birds. Also, we must remember that the needs of young birds and of old ones are essentially different.

And finally, there is the question of the season ; a food which gives excellent results at one time may be positively injurious at another. Nature appears to resent, for instance, too free a use of internal heat producers when she herself is supplying ample warmth from the outside; and even this little point not appreciated may result in much trouble and loss.
It is wholly impossible to go into details concerning the above matters in the present book, which deals with the foods themselves rather than with the principles underlying their use. It may be helpful, however, if I set out briefly the essential elements of a scientific diet under eight main heads, and give in each case a few short notes concerning their actions on the body.

It must, of course, be understood that these notes are not intended to be exhaustive in any sense of the word; the facts given are merely a basis upon which all good dieting schemes ought to be built. There is probably not one of the eight groups of food elements which can be omitted without detrimental effect on the birds, and the man who can arrange a suitable combination of nourishing, heat-giving, energy producing, and other like elements in the food-stuffs used in the aviary will be amply repaid for any trouble that may be expended in working out such a scheme.

PROTEINS

The proteins, or albumens, are the nitrogenous elements of food, and we learn from a study of physiology that the protoplasm of the cells of which the body is composed can be built up or repaired only so long as a sufficiency of proteins is available.

A deficiency of proteins quickly leads to a general impairment of functional activity, often with a marked loss of weight, and weakness of voice. It is well to bear in mind, however, that it is easily possible for birds, as well as for human beings, to imbibe excess of these nitrogenous foodstuffs, and this excess is then converted into poisonous waste-products within the system.

One of the first effects of an excess in proteins is to thicken the blood, and so to hamper unduly the freedom of its circulation in the vessels. Later on, the birds may put on too much flesh, and will be very liable to suffer from various metabolic troubles, and especially from diseases of the kidneys. All these troubles will clear up like magic on the reduction of proteins to physiological requirements.

As a rough guide to the nitrogenous constituents of some common foods, the following list may be useful. The figures appended show the approximate proteins per cent, in the seeds named : Canary. 14; Hemp. 16; Millet, 16 ; Niger, 17; Maw, 18; Rape, 20 ; Linseed. 25.

CARBOHYDRATES

Carbohydrates consist for the most part of starches and sugars, but, unlike the proteins, contain no nitrogen whatever, and are therefore quite incapable of building up a single cell of protoplasm. They are, however, of great use in contributing to the maintenance of bodily heat, and the production of energy, in addition to helping to replace the fatty tissues.
Carbohydrates, like the proteins, are to be found in varying quantities in the seeds of most plants, but here again excess is easily possible, and will usually show itself in a rapid increase of fat, which will sooner or later almost inevitably lead to impairment of the functions of the liver, and finally to actual disease, or even death.

The following list gives the percentages of carbohydrates in common foods: Rape,10; Maw, 12; Niger, 15; Hemp, 16; Linseed, 18; Canary, 50: Millet, 60.

HYDROCARBONS

Hydrocarbons consist mainly of fats and oils, and their work in the body is very similar to that of the carbohydrates. Many foods, such as Linseed, contain a very high proportion of these elements (often fully forty per cent.), and should therefore be used with care, especially with younger birds, and in the warmer seasons.
In addition to supplying heat to the organism, fats are of the greatest use in maintaining a healthy action of the intestines, though this very action, in the case of excess, is an ever-present danger in the case of oily seeds, the purgative action of which often needs to be modified by the admixture of more starchy foods. Canary seed, for instance, contains only about four percent, of fats, against the forty per cent, in Linseed, but has over fifty per cent, of starchy matters, so that the two seeds are often given as a mixture in order that one may serve to modify the effects of the other.
The percentage of fat in some common foods is shown in the following list: Canary 5% Millet 5%, Hemp, 30%, Niger 30%; Linseed 40%, Maw 40%, and Rape 50%.

WATER

There is, of course, in all natural seeds, however dry and hard they may appear to be. a certain percentage of water, which is absolutely essential to the maintenance of life.

I am aware that many have argued that a little water can easily be given to the birds in the usual state, and that, therefore, the amount contained in the various foods is a matter of no importance; but there are other sides to this question, and the first, of these is that the water occurring naturally in all vegetable foodstuffs is some of the very purest obtainable.

It follows, of course, from this that such water is in a much fitter state to carry on its many functions in the living body than when laden already with deleterious matter, for when perfectly pure it is no doubt the greatest solvent known, and so tends very decidedly to facilitate the workings of the system by establishing a quick removal of waste material, and a similar restoring of elaborated food products for the purposes of rebuilding.

But this is not all. It must be remembered, too, that the higher the percentage of water in a food the less the quantity' of the other essential constituents, and hence, as a general rule, one may say that foods containing a large proportion of water are seldom very nutritious, and must never be expected to take the place in any diet of the more solid food materials with a goodly percentage of proteins.

Green-foods, in particular, have a very low nutritive value (though of the utmost importance in other respects), and often contain over ninety per cent. Of water, with only one or two per cent, of body-building or heat-supplying elements.

From an economical point of view, therefore, it is sometimes helpful, in purchasing foodstuffs, to compare the actual percentage of water and solid food materials present, for the mere bulk of the foodstuff itself may count for very little in the science of diet.

Hens' eggs, for example, are popularly supposed to contain a very high percentage of nutriment, and yet, as a matter of fact, they are one of the most expensive foods to be had, for no less than seventy-three per cent, (or nearly threequarters) of their contents consists merely of water, whilst the nitrogenous elements, which alone can build up a single cell of vital tissue, are present to the extent of about twelve per cent. only. Eggs, contain, therefore, considerably less nutriment for our birds than the seeds in common use in the aviary.

The percentage of water in some common foodstuffs is: Niger 8%, Rape 11%, Hemp 12%, Millet 13%, Barley meal, 14%, Canary 14%, Maw 14%, Beef or Mutton.72%, Eggs 73%. Dandelion leaves 86%, New Milk 87%, Lettuce leaves 94%.

NUTRITIVE "SALTS"

A considerable portion--if not al1-of what is commonly called " ash " in dietetic analyses consists of what could better be called nutritive salts, though even this is a term which may readily be misunderstood.
It has, of course, but little connection with what we know as table-salt (really sodium chloride), but includes such substances as potash, soda, lime and magnesia, all of which substances, with several others, are contained in varying proportions in practically all seeds and green-foods in common use in the aviary. The importance of these "salts" (using the term in its widest sense) is immense, in spite of the scant attention given to them in dietetic literature.
The science of modem pathology is gradually establishing more and more convincingly the undoubted truism that most of the ever-growing host of bodily conditions, which both in bird and man we know as "disease," are really only the varying manifestations of one fundamental disease-a disordered blood-stream, and the basic cause of a vast amount of this ever-present malady is an insufficiency of nutritive salts in the diet.
We know that without food any organism will weaken and die; but what avails the richest abundance of foods in the alimentary canal, if their elements cannot be taken to the parts of the body where they are required for use ! And the nutritive salts make all the difference between digestion and no digestion; without their aid the secretions which keep the life-forces working cannot be elaborated, and, in their absence, death is inevitable.

But partial death-if one may so term it-in the shape of weakness or disease may appear long before the end, and this may often be overcome by the correct adjustment of aliment, if taken in time.

It is just here that we can see the vital importance of green-foods in the diets of certain birds. In their wild state they eat these as Nature dictates, and so secure the salts that are required for their bodily upkeep; but often in captivity they are denied these essentials, and suffer in proportion to their lack of strength and vitality.

It is a great mistake to suppose that mere artificial chemical salts, as purchased from the druggist, can ever be wholly substituted for the products of Nature's laboratory, for it has been proven over and over again by the most painstaking experimenters that these artificial salts for the most part leave the system as they enter it. their very crudity preventing their absorption by the delicate internal organs, which were intended for dealing with the natural organic salts only as found in abundance in the living plant.

VEGETABLE ACIDS

Although it has been said that vegetable acids are not. strictly speaking, foods, they play so important a part in the preservation of health that any discussion of the principles of diet is hopelessly incomplete which does not include them.

One of the chief among them is malic acid, which is found in considerable quantities in the fruits of plants belonging to the rose family, such as apples and pears, and particularly in the berries of the Rowan tree, or mountain Ash, from which it may be obtained as a calcium salt by boiling the berries with milk of lime.

Other important vegetable acids are citric acid and tartaric acid, both of which are found mainly in fresh fruits and green-foods, either as free acids, or combined with alkalies as alkaline salts. These, when taken into a living body, undergo a chemical change, and, by the formation of carbonates, may exercise a powerful influence in preserving a healthful alkalinity of the blood and other essential fluids. They also provide a small amount of bodily heat and energy, as a result of their oxidation in the system.

FIBER

Practically all natural foods contain a varying proportion of matter perhaps best described by the general term " fiber." In discussions concerning foods, this is often not mentioned at all, or is immediately dismissed as being of no value as a food, but any attempt to deal scientifically with the question of diet must necessarily include a consideration of this substance, for its influence on bodily functions is often immense, and its partial absence has doubtless caused more disorders and deaths than is ever likely to be realized.
I would, therefore, urge that fiber is not of no value to the system, but that, on the contrary, the bowels need a certain definite amount of it to stimulate them in their

natural functions, and that any undue shortage of such " waste" material through reliance upon concentrated or unnatural foods is often one of the primary causes of intractable costiveness, with all its baneful effects upon the system, either of bird or of man.

VITAMINS

Vitamins are a comparatively recent discovery. They are known to exist in a large number of unspoiled natural foods, such as greenstuffs, grains and fruits, and are absolutely essential elements in the diet of both birds and man. Pigeons fed on a diet from which Vitamins are excluded develop beriberi, or some other dreadful disease, in the course of a few weeks, and perish miserably if the missing substances are not restored.

It is impossible here to give details as to the best Vitamin-foods available, but their fundamental importance in any scheme of feeding can hardly be over emphasized. Many excellent books on the subject are now to be had, and reference must be made to these for further information.